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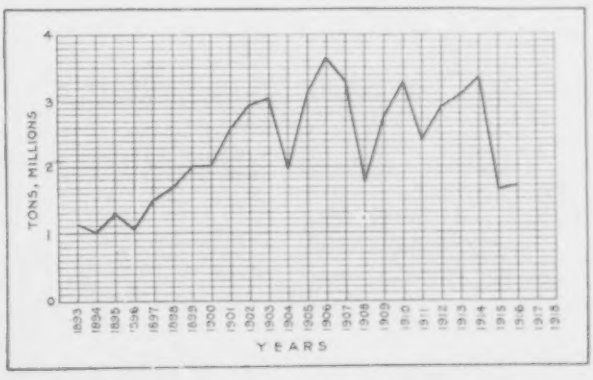
A Shortage of 10,000,000 Tons of Rails

Consumption Figures, After Allowing for Main Line and Siding Extensions, Regarded as Indicating Too Little Rail Renewing

BY C. W. GENNET, JR.†

THE production of steel rails in the United States has been a subject very largely neglected, since the war has attracted attention to other more necessary steel products. The accompanying table, compiled from statistics of the American Iron and Steel Institute, the reports of the Interstate Commerce Commission and the United States Department of Commerce, affords an interesting comparison of the production and consumption of rails in the United States since 1893.

While the tonnages shown include rails of the girder and other types for street railroad purposes, the consumption of standard section rails for regular steam railroad use is undoubtedly closely approximated by the figures given. This consumption is also shown in the accompanying diagram, and it will be noted that although the general tendency is for increased consumption the rate is surprisingly small when the increased mileage is considered. This condition may be attributed to two causes, namely, the generally heavier weight per yard of the section of rails rolled in succeeding years and the rapid growth of the use of open-hearth steel rails with a consequently longer life. Obviously the use of the heavier sections tends to prolong the life of rails, thus giving a decreasing rate of consumption, other things being equal. At the same time open-hearth steel rails, which have now for several years been produced in considerably greater amounts than Bessemer steel rails, admittedly afford a longer life, so that a decreasing rate of consumption might be likewise anticipated.



Annual Domestic Consumption of Rails for 24 Years

Notwithstanding these matters the question remains as to whether rails are being produced in the quantities demanded by the increased mileage and traffic of the railroads, and to this an answer can be indicated by further consideration of the statistics.

The Commerce Commission's reports show the mileage made up as follows for the fiscal years given:

	1893	1916	Increase
Single track	169,780	259,210	89,430
Second, third and fourth track	11,633	33,863	22,231
Yard track and sidings	40,451	101,869	61,418

Therefore, a total of 111,661 miles of track, apart from that described as yards and sidings, has been built in the last 24 years. Logically this would require all new rail, the average weight of which was probably close to 85 lb. per yd., so that roughly 14,900,000 tons of new rail has been necessary for this extension to the main track mileage. Yard track and sidings are generally built of old released main line rail and the increase of 61,418 miles in this class of track represents with fair accuracy the length of new rail necessary to take its place. This at 85 lb. per yd. would require 8,000,000 tons. Thus for

PRODUCTION AND CONSUMPTION OF RAILS AND TOTAL RAILROAD MILEAGE IN THE UNITED STATES

Year	Tonnage rolled	Tonnage imported	Tonnage exported	Tonnage approximately consumed	Total mileage*	Year	Tonnage rolled	Tonnage imported	Tonnage exported	Tonnage approximately consumed	Total mileage*
1893	1,136,458	2,888	19,876	1,119,470	221,863	1905	3,375,929	17,278	295,023	3,098,184	306,796
1894	1,021,772	300	13,556	1,008,516	229,795	1906	3,977,887	4,943	328,036	3,654,794	317,083
1895	1,306,135	1,447	15,599	1,291,983	233,275	1907	3,633,654	3,752	338,906	3,298,500	327,975
1896	1,122,010	7,796	73,131	1,056,675	239,140	1908	1,921,015	1,719	196,510	1,726,224	333,648
1897	1,647,892	415	148,221	1,500,086	242,013	1909	3,023,845	1,542	299,540	2,725,847	342,351
1898	1,981,241	200	301,903	1,679,538	245,333	1910	3,636,031	7,861	353,180	3,290,712	351,766
1899	2,272,700	2,134	277,714	1,997,120	250,142	1911	2,822,790	3,414	420,874	2,405,330	362,824
1900	2,385,682	1,448	361,619	2,025,511	258,784	1912	3,327,915	3,780	446,473	2,885,222	371,237
1901	2,874,639	1,905	318,956	2,557,588	265,352	1913	3,502,780	10,408	460,553	3,052,635	379,508
1902	2,947,933	63,522	67,666	2,943,789	274,195	1914	3,502,780	22,571	174,680	3,350,671	387,208
1903	2,992,477	95,555	30,837	3,057,195	283,821	1915	1,945,095	78,525	391,379	1,632,241	391,141
1904	2,284,711	37,776	416,250	1,906,237	297,073	1916	2,204,203	26,299	540,349	1,690,153	394,944
						Total	60,847,574	397,478	6,290,831	54,954,221	
						Av.	2,535,315	16,561	262,118	2,298,759	304,469

*Tonnage items are totals for calendar years, the mileage is for the years ending June 30, and includes all classes of track.

†Robert W. Hunt & Co., Chicago.

the 24 years' record there has been, in round numbers,

	Tons
Total approximately consumed	54,900,000
Required for extensions of main tracks	14,900,000
Required for replacements	8,000,000
Total	22,900,000
Amount available for renewals	32,000,000

A few of the leading trunk line railroads count on replacing 10 per cent of their mileage each year with new rail. Others, including many of the western and southern lines, have a yearly rail renewal program calling for a less amount of new rail, so that probably 6 per cent represents a liberal factor to serve as the average of common railroad practice and especially so since such would mean that the average life of rails was over 16 years.

Going back then to the Commerce Commission's records of main track mileage it will be found that 6 per cent of the total mileage on which rails should have been renewed amounts to 322,000. If the renewals were made in 85-lb. section (a very generous assumption) there would be required a total of 42,000,000 tons. Apparently, therefore, a shortage of approximately 10,000,000 tons of rail now exists on the railroads in order to bring them up to a prime physical condition, for as above shown only 32,000,000 tons have been available for renewals in the time stated.

Such a conclusion may seem like an exaggeration of facts. But in 1912 a special committee on relations of railroad operation to legislation brought out the fact that 63,000 miles of main line track was laid with rails of 75 lb. and lighter sections. No doubt much of this should have been replaced long ago. Replacing all of it in 85-lb. rail would have required 8,300,000 tons, but the consumption since 1912 has only been 9,600,000 tons and considering that the renewal of other or heavier rail must have been continued since 1912 as before, it is readily seen that a very large amount of light rail is now in service that should be replaced. Probably, therefore, the above estimated shortage of 10,000,000 tons is a conservative one after all, particularly in view of the high standard of maintenance necessary to enable the railroads to transport economically the tremendous volume of traffic desired.

With speculation rife as to business conditions after the war it seems justifiable to predict a large demand for rails and consequent large production when peace is finally declared. Although statistics of rail production in other countries are not available it is almost certain that the United States has practically supplied the world with rails for over three years. In that time Russia has taken 500,000 tons, France probably 200,000 and Italy and other countries more. Peaceful conditions will require much rehabilitation of railroad maintenance in the war stricken countries before even a normal resumption of other business can be attempted and rails and accessories for this rebuilding will most likely be drawn from our market. Likewise, American railroads, regardless of ownership, eventually will be bound to become large rail purchasers so that the future for rails should not be overlooked entirely in the present press for other products.

Hanging in the entrance of the main office to the Republic Iron & Steel Co., Youngstown, Ohio, is a service flag that shows that 345 employees of this company are in active war service and training camps at present, and this number will likely be largely increased.

The Adamson Machine Co., Akron, Ohio, which recently absorbed the Akron Steel Casting Co., has started a new 10-ton open-hearth furnace which will add approximately 25 tons a day of such castings to its present converter output.

Heat Transmission Through Roofing

Under certain conditions, where extremes of temperature are to be avoided, the heat-insulating property of a roof is as important as its strength and durability according to an article by Dr. W. M. Thornton, Armstrong College, Newcastle-on-Tyne, England, which appeared in *Engineering*, London, Oct. 19, and from which the following abstracts have been taken:

The heat insulating value of roofing material depends more upon the nature of its surface than upon its thermal conductivity. A sheet of galvanized iron on which the crystal surfaces of the alloy were fresh and bright was tested. Such a surface is practically a mirror, and only 111 British thermal units were transmitted through per 100 sq. ft. per hour. When the exposed side of this material was blackened, the rate of transmission increased so that half as much more heat passed through. When the inside was blackened, more than double the amount of heat passed through per hour, and when both sides were blackened 581 B.t.u. per hour was transmitted.

These results were also confirmed by tests on corrugated iron taken from actual roofs. Old galvanized iron allows more heat to pass through it than glass does. The slates were found to be good insulators, but are referred to as a heavy roofing material. Deal boarding covered with asphalted felt, though thick, is not so heavy as Welsh slate, and is considered one of the best insulators. In this case, its poor conductivity is evidently not negligible.

Heat Transmitted Through Roofing Material

Material	B.t.u. Per 100 Sq. Ft. Per Hr.	Thickness, In.	Weight, Lb. Per Sq. Ft.
Bright galvanized iron sheet	111	0.040	1.60
Galvanized iron, blackened below	168	0.040	1.60
Galvanized iron, blackened above	385	0.040	1.60
Galvanized iron, blackened above and below	581	0.040	1.60
Galvanized corrugated iron after one month's exposure to the weather	310	0.033	1.28
Galvanized corrugated iron after one year's exposure	422	0.033	1.28
Galvanized corrugated iron painted black above	472	0.033	1.28
Roofing glass, serrated	453	0.220	2.25
Welsh slate	337	0.170	2.90
Westmoreland slate	248	0.250	4.80
⅞-in. T. G. deal covered with asphalted felt	124	1.000	2.60

The National Physical Laboratory, England, reports that air spaces in roofing materials may be advantageous. A satisfactory means of obtaining this is to lay corrugated asbestos-cement plates on the thinnest asphalted felt or other light sheet material, supported by the roof frames. Where heat insulation and lightness are of the first importance, a strong and efficient roofing can be made in this way at a reasonable cost.

An Industrial Lift Truck for Heavy Loads

The Lewis-Shepard Co., 48 Binford Street, Boston, has developed a new type of industrial lift truck. This is designed for heavier duty than the two which were illustrated in THE IRON AGE, May 4, 1916, and Oct. 18, 1917, which had maximum capacities of 5500 and 2500 lb. respectively. The new truck, which is capable of elevating a load of 8000 lb. a distance of 3 in., has all of the standard features of the line, such as the universal joint that provides a free lifting and steering handle and enables the load to be elevated with the handle of the truck turned to one side. A release check controlled by a pedestal located on the front of the truck is provided for lowering the load. The new truck is made in 10 models, five having wheels 7 in. in diameter, while those of the other five trucks are 10 in. This recent addition brings the line of trucks made by the company up to 34 different models divided between four types.

The Dayton Electrical Mfg. Co., Dayton, Ohio, has been incorporated with $125,000 capital stock. The company's plant has been operating under a receivership for the past few months. H. G. Catrow is president.

Automatic Feed Tool Grinding Machine

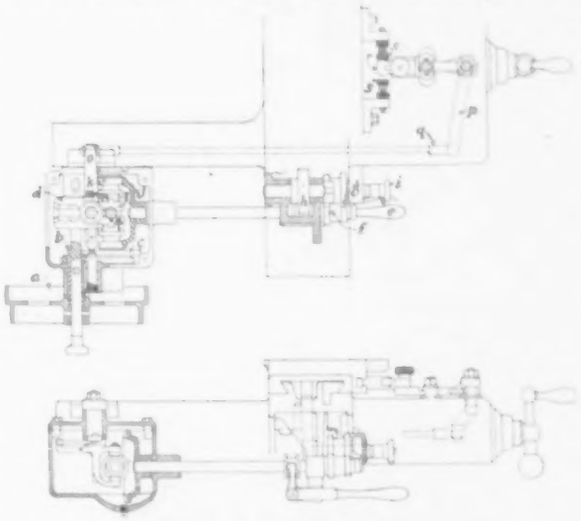
An automatic type of feed mechanism has been developed by the Wilmarth & Morman Co., Grand Rapids, Mich., for attachment to its universal cutter and tool grinding machine. It is arranged so that it can be attached to machines of this type for which hand feed is provided with but little work. A gearbox containing all of the mechanism is provided and enables eight table speeds ranging from 12 to 75 in. per min. to be obtained from a single self-contained unit.

The gearbox is attached to the saddle on a pad at the rear and is driven from the main countershaft by a two-step cone pulley *a*. One speed is provided by the sliding pinion shaft *b* engaging with the two-step gear *c*. By sliding the shaft out of engagement with this gear and engaging the key of the gear *d* the second speed is obtained. Two other speeds are secured from a nest of gears by the movement of the starting lever *e*. This lever is engaged to the sliding shaft with a key working through a slot and is thrown into engagement with the two clutch gears *f* and *g*. The lever is held in position by a plunger actuated by a spring. The clutch pinions are spaced by a collar which permits a neutral position to be obtained in which all of the mechanism is entirely disengaged from the table. The movement of this starting lever provides the third and fourth speeds for the table and the remaining four are obtained by shifting the belt to the other step of the driving pulley *a*. The starting lever *e* can also be employed for stopping the table.

The motion of the table is obtained through a small pinion meshing with an idler gear *h* that in turn engages with the rack secured to the table. The pinion shaft *i* is arranged so as to make it possible to disengage the idler gear *h* from the table and thus throw out the power feed. When this has been done the table can be operated by the handwheel at the front of the saddle or by the lever at the rear without employing any of the power feed mechanism that drives the table.

The gearbox contains a bevel gear *j*, two bevel clutch pinions *k* and the clutch *l* which can be brought in engagement with the teeth on the clutch pinions. The motion is reversed by the engagement of the clutch with the pinion on either one side or the other. The clutch is secured to a shaft which runs through the gears and has a bronze bushing *m* which is double splined. The clutch is free to be engaged with either of the bevel clutch pinions *k* by the lever *n*. This is operated by a bell crank *o* which is connected to a second bell crank *p* by the rod *q*. The lever *r* which in turn is operated from the table by the dogs *s* provides for the automatic operation of the feed. These dogs are carried in a T-slot in front of the table and are adjustable to bring the work into the correct position with relation to the grinding wheel. In this way it is possible for the operator to vary the length of the stroke as may be desired at will.

A Gearbox Attached to the Saddle on a Pad at the Rear Provides Eight Table Speeds Ranging from 12 to 75 In. Per Min.



Details of the Automatic Feed Mechanism

Equipment and Operation of Traveling Cranes

In a paper on the "Mechanical Safeguarding of Traveling Cranes," presented at the recent congress of the National Safety Council by J. C. Smith, safety director, Inland Steel Co., Indiana Harbor, Ind., it was emphasized that the tendency on the part of the purchasing agent was to keep down the cost of the equipment at the sacrifice of the safety features. He pointed out that while the cost of cranes was greater than formerly profits resulting from their use had also increased and it was more economical to buy a safe modern crane than to purchase one of the old type which the factory inspector might order guarded at a time when it was needed. In the Inland plant it was the practice to get cranes with all the safety features incorporated in the design, as the chief engineer believed from experience that such a crane was the most efficient from an operating standpoint. Safe, easy means of access and safety features, he said, as a general proposition encourage frequent inspection and lubrication, which means few delays and breakdowns.

After a résumé of the specifications of various crane purchasers, Mr. Smith went on to show that most overhead traveling crane accidents occurred in connection with operation and were not due to the lack of safety devices. He pointed out that it was just as important to have safe men to fill the positions of crane operator and hooker as to specify that a crane should be equipped with safety devices. He gave as the qualifications for a crane operator a mechanical turn of mind, quickness in thought and movement coupled with caution and carefulness, agility, keen vision and an even temper. Crane operators should be young and active and hot metal cranemen require at least years of experience before undertaking this class of work. He condemned the practice of employing cranes to move cars as well as the making of side pulls except where absolutely necessary. The operator should not run more than two motors at one time and when handling molten metal only one motor should be operated. The crane hooker should exercise care to avoid accidents and should never ride on any burden being carried by a crane. The hooker should watch the load being carried by the crane or suspended in the air and keep out from under it at all times. When loads are carried by cranes it was the duty of the hooker to warn the men on the floor to get out of the way.

Methods to Improve Plant Fuel Economy

The Case of Purchased Power—Boiler Room Equipment, Steam Traps and Heating Mains —Practical Suggestions on Boiler Practice

BY S. J. H. WHITE

THERE are many hundreds of cases in cities, where central station power and heat will prove cheaper than if generated by a private plant. The writer considers such cases as legitimate central station business. But factories so located that heat and live steam as well as power cannot be purchased from central stations, especially those requiring steam for manufacturing purposes during the entire year, are not legitimate central station business. Business secured by the central station from such factories can only result in loss to the consumer, dissatisfied customers to the central station, and a waste of fuel. Assuming that a factory purchasing power from a central station can operate its steam plant for steam and heat, on the same quantity of coal that would be required if generating its own power, the amount of coal the central station consumes in producing the power sold to such a factory will be wasted.

The writer is a former central station man of 20 years' experience as manager of central stations and knows both sides of the question, central station power versus isolated plants. He has had two and one-half years' experience with an isolated plant and four years with purchased power in a certain factory. The ratio of costs was decidedly over two to one in favor of the isolated plant, and 15 per cent fixed charges on the power plant was included in the costs of operating the isolated plant. The coal consumption, in the plant referred to, per boiler horsepower-hour with the isolated plant averaged, for two and one-half years, 6.16 lb., while with the boiler plant used for heat and steam generation only, the coal consumed per boiler horsepower-hour averaged, for four years, 7.74 lb. of coal. During the heating season the steam and heating plant only averages an evaporation of about 4 lb. of steam per pound of coal, running to 7 or 8 lb. in severe weather when the boilers carry a good stiff overload. During the summer, when steam is used for manufacturing purposes only, the boiler averages only about 1 lb. of steam per pound of coal.

The load in summer is about 30 hp.; hence, if a power unit were installed in this particular plant, a load of not less than 150 to 160 hp. (sufficient power to drive the machinery) could be carried without a material, if any, increase in coal consumption, as the boiler would under such conditions evaporate 6 to 8 lb. of water per pound of coal throughout the year, and conserve at least the amount of coal the central station is now consuming to produce the power sold. The boilers in question are wasting at least the difference between 6.16 lb. and 7.74 lb. of coal per boiler hp.-hr., or 20.4 per cent of the coal consumption. The conservation of 20.4 per cent of the coal consumption in only 2000 factories like the one under discussion would amount to 834,224 tons of coal, almost one million tons per year. Add to this saving the amount conserved by central stations now furnishing power and we would conserve 1,000,000 tons.

A certain factory plant recently investigated by the writer, with a view of reducing the coal consumption, is an unusually expensive plant to heat successfully. The officers of the company owning the above plant, as frequently happens, put more confidence in the smooth talk of a central station solicitor from the nearest city than in their own engineer's arguments and figures, and decided to purchase electric power in preference to producing it themselves by a private plant. The private power plant would have cost about $20,000. Taking the central station agent's figures of 15 per cent as the basis for the fixed charges, the latter would amount to $3,000 per year. Yet the factory had to invest $10,000 in a heating and steam plant, and the fixed charges on same must be paid just as on a power plant (the same boilers used for heating could be used for power); so the factory must pay $1,500 per year, after all, on fixed charges. The demand charge was fixed at about $1,200 per year, an unusually low figure. This $1,200 demand charge paid to the central station, plus the $1,500 fixed charges on the heating and steam plant makes a total of $2,700 per year. Where did the central station prove its generosity and save the factory $3,000 per year as promised on fixed charges?

Power Plant Equipment

There are any number of private plants operating at excessive costs, with tremendous waste in fuel, which need complete overhauling and proper management. Many have the poorest, cheapest equipment, and under such circumstances cannot be made to operate economically. Such plants should be shut down by the Government if the owners refuse to make the necessary improvements. The best machinery on the market is none too good; cheap machinery is always a bad investment. Cheap help also will prove expensive, no matter when you use it, but do not attempt to use cheap help in the boiler or engine rooms.

A feed water heater at a cost of $7.50 per horsepower may heat the water to 150 deg. Fahr. while one at $10 or $15 per horse power will heat the feed water to 212 deg. Fahr. The difference in price will be paid back to you in coal saved in less than one year. An engine can be bought for say $2,500 which will consume 28 to 30 lb. of steam per horsepower-hour, while another engine costing $3,000 will consume only 20 lb. of steam. If you are buying your equipment to use only a few months perhaps the cheap engine might do, but remember you expect to run this engine 20 or 30 years, so the savings for that number of years will run into many hundreds or thousands of dollars. A boiler can be purchased at $10 per horse power, say, which at best will only make 5 or 6 lb. of steam per pound of coal, while another type costing $15 to $20, say, per horsepower will produce 8 or 9 lb. of steam per pound of coal.

Exhaust Steam Mains and Traps

There are any quantity of steam traps on the market, some of them good, others better, and lots of them worse. Not very definite information, we admit, but the point is this: Whichever make you buy you are likely to wish you had bought another make within two years' time. Recent trap troubles

in a certain plant resulted in the installation of 15 new high-pressure traps with a resultant saving of 1500 lb. of coal per day, and a very decided improvement in the operation of steam-consuming devices. Watch those traps of yours, they may be automatic in operation, but they certainly will waste a lot of steam if you neglect them too long.

The customary scheme of running large low-pressure heating mains from boiler house to buildings is the only thing which can be done when using exhaust steam for heating. Great care should be used, however, to insulate such mains to prevent heat radiation losses as far as possible. Whenever buildings are to be heated by live steam, such a scheme of mains is dead wrong. Instead run high-pressure mains from boiler house to the buildings, placing reducing valves as near the inside low-pressure heating main as possible, and you will save considerable coal.

A certain factory-heating system was designed and installed, entirely contrary to the company engineer's recommendation, by a consulting engineer who had more theoretical than practical training, and up to the time the company engineer was permitted to remodel it, it had been impossible to heat the extreme ends of the building, while the central portions were uncomfortably hot. The company engineer is now feeding the inside heating main at two points from the high-pressure steam main, using two small reducing valves, and has cut out the large low-pressure underground main completely from boiler house to the main buildings. The result is a saving of not less than 20 per cent of coal, and the building is uniformly heated. The boilers are not seriously taxed in cold weather as formerly, and the employees in some departments have no complaint of being cold as they formerly had almost constantly. So far, the engineer referred to has been unable to persuade the company to insulate the heating mains, branches and risers.

Some Practical Suggestions

You should insulate your heating and steam pipes, by all means. It will pay large dividends on the investment.

Where coal shows a tendency to clinker, the use of steam jets directly under the grates, and arranged to blow straight up into the fuel bed, will result in much easier firing, fewer clinkers, less ash, fewer cleanings of fires, and naturally a decrease in coal consumption.

The ideal method of firing boilers, of course, is by the use of mechanical stokers. At the normal price of coal, the writer seldom advised mechanical stokers in plants under 500 hp. boiler rating, but with coal at present prices he has revised his minimum to 200 hp. rating. Shaking or rocking grates are such a decided improvement over stationary grates, they should be used in all furnaces where mechanical stokers are not installed on account of first cost.

Gas analysis is unquestionably a valuable means of locating and reducing losses of combustion. The instruments are not expensive, are easily understood and operated, and should be furnished engineers of all steam plants by the owners. After several gas tests in connection with draft gage readings, a fireman should be able to maintain high CO_2 percentages by watching his draft gage. The draft gage seems to the writer almost as important as a steam gage (of course ignoring the safety feature of the latter) it costs but little more than a steam gage, and there is no excuse for any plant to be without one. Yet there are comparatively few in use. It will save enough coal in a week to pay for itself, if used properly.

Another thing every plant should have, but few have, is an automatic damper regulator. Unfortunately a good regulator costs from $100 to $150, and business managers are unable to see their necessity when they know the plant has got along without one for a number of years. That is a poor argument, of course, but the engineer is up against the real thing when he tries to get his company to buy one of these coal savers. The high cost of coal, the necessity to conserve coal, may now result in arousing the business management to listen to these practical requests, to furnish the equipment necessary to conserve coal.

Much more can be stated on methods to adopt to conserve coal. Weigh your coal as you use it, meter your feed water, weigh your ash, read your output meters, record the hours heat, steam and power are used daily, keep all the records you can, and compare the results daily. If your firemen only secured an evaporation of 5 lb. to-day, make him try for six to-morrow, and if he does not get it, find out why and remove the causes, so he will get 7 lb. the next day.

Business Policy Obstructs Progress

Probably 90 per cent of the works engineers in charge of factory power and heating departments in this country have had similar experiences in having practically all plans for improvement in steam plant efficiency, with consequent reduction in coal consumption, almost completely blocked. Where these plans call for large expenditures or are impracticable, there are excuses for the company's refusal to carry out the plans possibly; but generally these plans are not expensive and are entirely practical. If carried out to completion they would give excellent results, and pay handsome returns on any investments made. Not infrequently the carrying out completely of these plans will result in a saving of coal sufficient to offset the increased cost of coal per ton, or possibly even more.

Multiple Force Feed Lubricator for Bearings

A force feed lubricator of either the single or multiple type has been developed by the Inter-State Machine Products Co., Inc., Rochester, N. Y. It is designed for supplying oil to the valves, cylinders and bearings of pumps, air compressors, engines and similar units. The special feature of the lubricator is the pumping unit, which is locked to the cover at three points and may be removed with its individual cover without disturbing its adjustment or removing any other part of the lubricator. Each unit is actuated by the cam on the mainshaft, which in turn is driven by a roller clutch or a worm gear drive. Each pump unit can be adjusted to deliver from 1 to 16 drops per stroke by regulating the adjusting nut on the outside of the lubricator case, the number of strokes depending, of course, on the speed of the engine or other source of power. A large sight feed is provided near the adjusting nut to show the rate at which the oil is being pumped. A gage glass on the corner of the tank indicates the amount of oil in the reservoir. If desired the oil can can be pumped by hand without disturbing the adjustment.

The St. Louis Aircraft Corporation, formed by officers of the St. Louis Car Co. and the Huttig Sash & Door Co., St. Louis, will undertake the construction and equipment of airplanes for the United States Government, utilizing the two plants mentioned for the work involved. Messrs. Alfred J. Siegel of the Huttig company and E. B. Meissner of the St. Louis Car Co. are the chief officers of the new concern which plans to turn out about 200 airplanes per month.

Industrial Housing Problems*

Labor Shortage Forcing Manufacturers to Build—Housing Essentials—Dwellings for Skilled and Unskilled Workmen

BY LESLIE H. ALLEN

DURING the past two or three years employers of labor in all of our big industrial centers have experienced such great difficulty in getting and keeping employees that much attention has been focussed upon the employment situation. In view of the probability that it will not change for four or five years after the close of the war, the manufacturer is faced with the very serious problem of how best to compete in the labor market for his needs, with the knowledge that housing is an important factor in which he will get no help from local investors as in former years.

The Effect of Bad Housing on Industry

Apart from any consideration of this subject from the humanitarian or sentimental side, the industrial employer is beginning to realize the tremendous importance of housing conditions in their relation to production. The output of a plant is seriously affected by the prevalence of sickness, so often caused by unsanitary surroundings of the workman's house and overcrowding inside. The interest of the employer in the health of the employee is being shown in better sanitary accommodations in the factory, the provision of rest rooms, hospitals, recreation parks, club rooms, etc. In so doing he has recognized the importance to his plant of happy, healthy employees. The provision of decent houses for them is but a short step further.

Building for Skilled and Unskilled Workmen

When the manufacturer has decided to build, he is faced with the problem of selecting the type of house. It must first be recognized that we have two classes of workmen to be considered: (1) The unskilled workmen, mostly foreigners or negroes, uneducated, unused to American houses and American standards of living, earning a very low wage, and (2) the skilled men, mechanics, machinists, etc., earning a higher wage, mostly Americans, living according to American standards, demanding more and willing to pay more for the comforts that the foreigner does not consider essential. The result of a failure to distinguish these two classes is that at the present time nearly all the houses built are American houses for skilled workmen, and the need for better houses for unskilled labor has remained unsatisfied, resulting in overcrowding, getting worse and worse. Here and there, as in Philadelphia and Washington, a most excellent attempt has been made to solve the problem of housing the unskilled, low-paid workman. Such examples have not been copied, and only serve to show up more sharply the mistakes of other cities.

Housing Essentials

The essentials of a modern city house may be summarized as follows:

Watertight roof, walls and floors.
Bedroom for parents.
Bedroom for male children.
Bedroom for female children.
Living-room for cooking, eating and general day use.
Private toilet-room with sanitary water closet and sewer connection.
Suitable heating arrangements.
Running water supply fit for drinking.
Uninterrupted daylight and ventilation through windows in every room.
Sink in kitchen, with running water and waste.

Further additions required by the American workman and his family and practically always considered necessary by them:

Cellars.
Closets.
Bathtub with running water.
Window screens.
Separate parlor.

Desirable improvements which usually are added to the workingman's house:

Porches and piazzas.
Lavatory bowl.
Hot-water supply to bath and bowl.
Window shades and blinds.
Dining room separate from parlor or kitchen.
Electric lighting or gas piping.
Wall paper.
Laundry tubs.

Need for Economy

Any attempt such as the above to divide essentials from luxuries must come in for a good deal of criticism, as there is bound to be a difference of opinion upon the details of such a list. The classifications suggested will at least serve to indicate the lines upon which the planning of a house should be studied in view of the need for strict economy in designing and building necessary to bring buildings down to a cost that will be remunerative.

It is generally agreed by economists that the workingman cannot afford to pay more than one-quarter of his monthly wage in rent. This means that the man earning an average of $12.50 a week cannot afford to pay more than $150 per annum. Assuming that a housing operation ought to pay at least 10 per cent gross per year, this gives $1,500 for purchase of lot with sewer and street improvements and the building of a house. At the present time a four-room house of good construction cannot be built for this money and it is therefore necessary to plan with the very strictest economy.

Many of the workmen whose homes we wish to build have come from countries where four walls and a roof are considered a sufficient shelter from the elements to make a home. Although we do want to see them housed in a better manner than this, yet it is not necessary to give them a six-room house, large cellar, furnace heat with running hot water, laundry tubs, lavatory bowls, picture moldings, and all the other comforts and luxuries that are required by higher-paid workmen. We should give him a house that will not harbor vermin, that will not be damp or unhealthy, a house in which every room has a proper amount of light and ventilation and direct sunlight, and that has decent privacy in its sanitary accommodations and sufficient bedrooms for the sexes to sleep apart.

Types of Workmen's Houses

The various types of houses now in use by industrial workers are:

Single houses of five to seven rooms.
Two-family houses of four to seven rooms.
Terrace or row houses of four rooms and up.
Apartment houses or tenements, two rooms and up.
Boarding houses for single men.
Hotels.

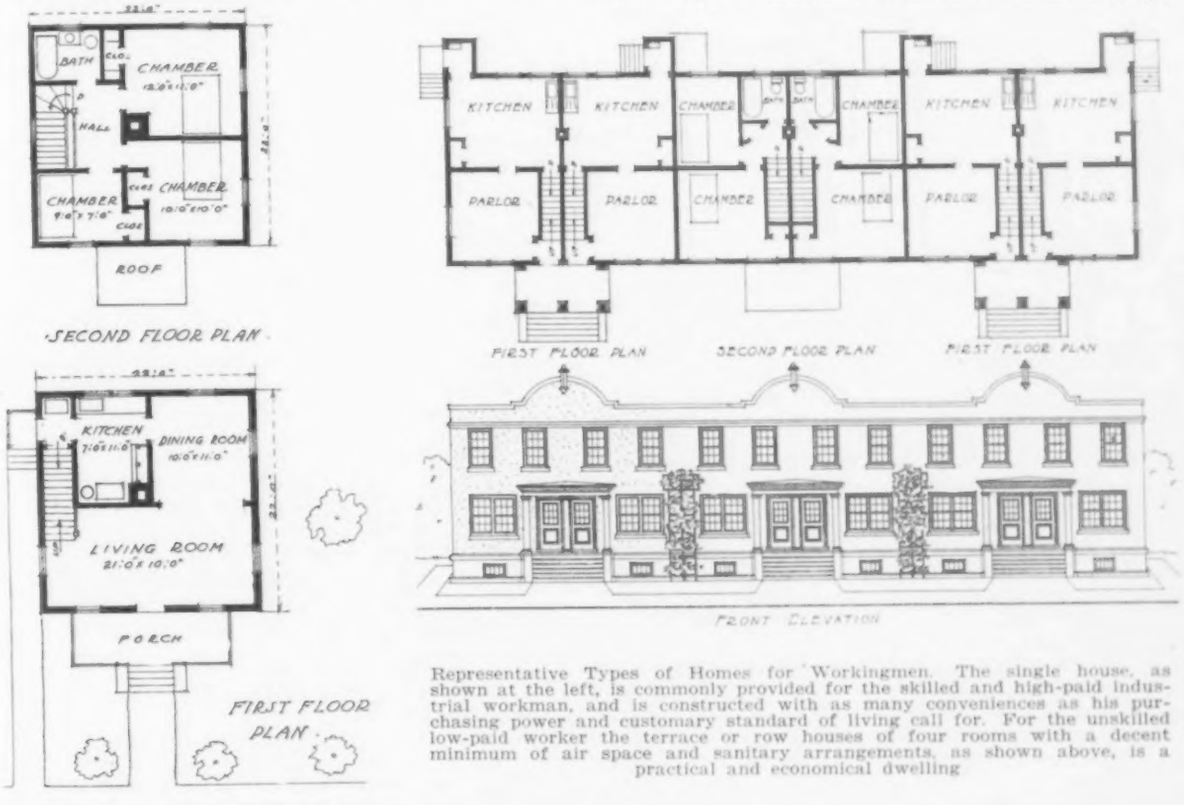
The single house is the ideal residence for the American family, but is beyond the means of the low-paid unskilled workman. A single house with five or six rooms with 3000 sq. ft. of land cannot be built for less than $3,000 except in the cheapest kind of frame construction, and even at this price it would call for a

*From a paper presented at the convention of the National Housing Association in Chicago, Ill. The author is with the Aberthaw Construction Co., Boston, Mass.

higher rental than he can afford to pay. For higher-paid men in the plant the single house is very desirable.

The two-family house is often built for workers who wish to purchase their home. Though not suitable for the unskilled worker, they are quite attractive to higher-paid men who like to buy a two-family house so that the rental received from one-half of the house will help to pay the carrying charges and amortization of the whole house. In some cases these are built side by side with a party wall and in other cases one tenement is built above the other. The first-named is preferable, as there is more privacy.

One of the of the most successful houses for the unskilled worker is that known as the "Philadelphia" type of house, of which many thousands have been built in Philadelphia, Washington, and other large cities. The typical four-room Philadelphia house is two rooms deep and has a living-room and kitchen downstairs, two bedrooms and bath upstairs. It is built in long rows or terraces with party walls in between. These can be built on as narrow a frontage as 13 ft. 6 in. (a 15-ft. frontage is desirable) on a lot of 900 sq. ft. The cost of both land and building is much lower than the preceding type. Houses built when prices were normal



Representative Types of Homes for Workingmen. The single house, as shown at the left, is commonly provided for the skilled and high-paid industrial workman, and is constructed with as many conveniences as his purchasing power and customary standard of living call for. For the unskilled low-paid worker the terrace or row houses of four rooms with a decent minimum of air space and sanitary arrangements, as shown above, is a practical and economical dwelling

have been rented for as low as $12 a month and have shown a fair profit.

The building of houses in terraces is comparatively new in this country except in Philadelphia, although it is very common in European countries. It allows for a very little land per house unless the lots are very deep, but is desirable in many other ways. Each family has a direct entrance from the street without any common hallway and is not interfered with by other tenants overhead. The cost of heating the house is less owing to there being fewer outside walls. In a house two rooms deep each room has a proper amount of light and ventilation, and these houses have proved very successful wherever they have been used.

A recent variation of this type of house is the three-room two-family terrace house with one family on each floor. These are generally in demand by married couples without children.

The multiple dwelling or tenement house, housing from ten to fifty or more families, is undesirable from many points of view, and yet in crowded cities where land values are high is practically the only solution.

Apartments of all sizes can be provided, the most common arrangements being three rooms (kitchen, living-room and bedroom) or four rooms (kitchen, living-room and two bedrooms). Each apartment should have its own private toilet and its own water supply.

There is always some demand in a large manufacturing center for small apartment-houses of two or three rooms with bath, etc., for married couples without children. They are not so desirable as homes for the workingman, and yet there are some mechanics who prefer them just as so many well-to-do people in our cities are content with and prefer this class of dwelling.

In rural districts many mills have built small boarding houses large enough to take care of from eight to a dozen boarders. The advantages of a small boarding house are that one man and his wife can run them, and the mill has no further responsibility. The men also prefer this sort of lodging to big company houses. The big disadvantage is that it is difficult to exercise any supervision over this sort of boarding house, and they may be misused or overcrowded. This far outweighs its advantages.

The good points of the boarding house for fifty to sixty men are that one efficient married couple with three servants can run the place without difficulty. A higher type of tenant is required to handle a proposition of this kind, but they can be secured fairly readily. It is easier to arrange for proper inspection and supervision, as in most cases, these are run as "company houses." A boarding house for more than sixty is too big a proposition to be handled this way, and would have to be run like a hotel.

The Manufacturers' Local Needs

The industrial manager at this point may well stop in bewilderment, not knowing how to proceed next, what size and type of house he needs to choose from this list being quite a puzzle. On this point it is impossible for any expert to offer advice until his local needs are accurately determined, and to do this the only safe way is to institute a careful survey of the housing conditions and needs of his locality.

Suiting the House to the Needs of the Occupant

There should be in every home enough bedrooms for the parents and the children of either sex to sleep apart. A good-sized bedroom should be provided for parents (and infant children) and two smaller bedrooms, large enough to accommodate two persons each for the other children. All families, of course, are not of the same

size, and some larger and smaller houses will be needed; but as a rule it will be found that the larger demand is for the four-room, five-room and six-room houses. Where houses are built to sell, however, the six-room house is as a rule the smallest that one can count upon selling without difficulty.

The size of the bedroom should be sufficient to give at least 400 cu. ft. of air space per min. All bedrooms should open onto a hall and not into each other or into a living room. The toilet room must be planned so that it opens directly off the stairs.

Next, there must be provided at least one living room of not less than 135 sq. ft., for working, eating, washing, and general use. Separate dining rooms and separate parlors add much to the expense of the house and it is not always possible to provide them for the unskilled laborer. What the foreigner needs is one large kitchen. It is the habit of most foreigners and of many Americans to live in this room, and it should be large and well-lighted and ventilated. It is found that where three living rooms are provided, two of them are invariably used as bedrooms for lodgers.

Some comment will naturally be made on the suggested omission of the cellar. We are told that the family needs a cellar for the storage of coal and canned fruit, and that it costs no more to build it than to leave it out. In investigating the contents of laborers' cellars the writer has never found large supplies of food or fuel. The laborer is too poor to buy more than two or three hundred pounds of coal at a time, and never lays in stocks of food in advance; instead of this we usually find in his cellar a miscellaneous assortment of most unsanitary rubbish and junk, which constitutes a serious fire menace. Statistics show that over 80 per cent of dwelling-house fires start in the cellar in such rubbish. The argument that it costs no more is nearly true where sand and gravel soils are encountered, but in clay or other hard digging the extra cost of digging the cellar mounts up considerably. Cellars are not needed for furnaces where the tenant cannot afford the fuel for them but derives his heat from his kitchen stove.

Costs of Different Types of Houses Compared with Ordinary Frame Construction

Wood framing, inside wood lathed and plastered, outside rough boarded and clapboarded and painted	102%
Wood framing, inside wood lathed and plastered, outside wire lathed and stuccoed	108½%
6-in. concrete wall, inside furred and lathed and plastered, outside rubbed smooth	112%
6-in. concrete wall, inside furred and lathed and plastered, outside stuccoed	116%
8-in. hollow tile, inside plastered direct, outside stuccoed	111%
8-in. brick wall, inside furred and lathed and plastered	115½%
Wood framing, veneered with 4-in. brick, inside lathed and plastered	113%

In houses of this class the tenant usually furnishes his own stove, and as his stove has no hot-water front, a system of hot-water piping is of no use to him. Some owners prefer to install the stove with water front and hot-water piping in spite of the increased cost of the house, but all these things help to put up the cost and the resultant rent to a figure higher than the tenant can afford. For the same reasons washbowls in the bathroom, and laundry tubs, though useful, are not necessities. There should, however, be an enameled iron sink in the kitchen, and a bathtub should be provided even if the tenant has not learned how to use it. There should be a proper supply of running water, pure, and fit for drinking, and a water closet connected with the sewer, and a cast-iron enameled bath.

Materials of Construction

Although no exact cost data can be given at the present time on the common building material, the following figures are given in order to indicate the relative costs of these materials based on present prices. As prices do not vary consistently, these figures may not hold good for very long. In certain localities where clay for tile making is abundant the prices of tile would be cheap and would indicate that this is the cheapest material to use. In other places where there is a good gravel supply right on the ground the relative cost of concrete would be reduced.

Assuming the cheapest construction, a wood framing, wood lathed and plastered on the inside and rough boarded and shingled on the outside, as standard or 100 per cent, the relative costs of various types of houses would be as given in the accompanying table.

The chief roofing materials in use at the present time are wood shingles, asphalted felt shingles, asbestos shingles, slate, tile, "ready" roofings, tar and gravel built-up roofings and tin roofings, the last three being used for flat roofs.

The cedar shingle, while still in common use, is slowly giving place to other materials. Many cities have legislated against it, and as the asphalted felt shingle, which is a good deal more fireproof, can be put on for about the same price, it is coming into general use. The asbestos shingle costs about twice as much, and is not so commonly used, although it makes a more permanent roofing.

The cost of tile and slate roofing is so much higher than the above that they have to be left out of consideration in workmen's houses.

The flat roof covered with a five-ply built-up tar and gravel roofing is considerably cheaper than any of the preceding, but its appearance is generally objected to. Various types of ready roofing are used as substitutes for built-up roofs, but, on account of the difficulty in making good water-tight joints they have not come into general favor. The tin covered roof is being used less and less. It is more expensive than the built-up roof and requires frequent repainting and maintenance.

Wood lath and plastering continue to be the customary method of finishing walls and ceilings. Plaster board covered with a finish coat costs very little more, and where speed is essential can be put on and dried out much more quickly. The various wall boards and composition boards offered as substitutes for plastering are not satisfactory for industrial houses. The cost per square foot is low, but the waste in cutting is very great unless specially ordered, and the result is not so permanent.

Interior woodwork is best stained and varnished and not painted, as it is less easily soiled.

Wall papers add nothing to the comfort or health of the tenant, but do add to the rent he has to pay, besides proving a harborage for vermin. Kitchen and bathroom walls are best painted with lead and oil, while many owners leave all others rooms bare or tint them with cold water paint.

Architectural Design

No laws or limitations as to style can be laid down. The designer of the workman's house is usually working under very strict limits of cost. It is his duty first of all to plan for the comfort, safety and health of the tenant, and if after this is done he has still some money left for architectural adornment, the money spent in this way is money well expended.

In planning a house the square plan bounded by straight lines is the cheapest and most economical. As the plan changes from square to oblong, the ratio of walls to floor space increases, and with it the cost. Any departure from the right angle means increased labor and waste of material in cutting.

No applied architectural ornament can equal the beauty or permanence of a careful planting of trees, shrubs and vines. The plainest of houses suitably planted with quick-growing vines on permanent trellises, and with good shade trees in front will look far better than the most ornate building elevation and cost much less.

Layout of Streets and Lots

The monotony of straight rows can be avoided by houses set at varying distances from the frontage line, and the appearance of the street improved.

In laying out the street line it will generally be found that the streets which follow contours of the ground, provided these are not too irregular, give a

more pleasing effect, and in many cases save large sums of money.

No general rule can be laid down as to the size of the lot that should be given the worker. In some sections the English scheme of gardening in "allotments" has been tried successfully. In such cases the houses are built on very small lots of land and a reservation of several acres is provided for gardening. This is fenced in and cut up into small allotments and let out in small sections to those who wish to take care of gardens. A garden properly cultivated is a very beneficial thing, but a lot of land which is allowed to become the dumping ground of dirt and refuse is of no benefit to anybody, but rather the reverse.

In city developments it will probably be found best to give very little land to the tenant, but to use the land that otherwise would have been allowed him in the maintenance of parks and playgrounds for children and allotments for gardening.

Selling and Renting Houses

When the houses are built a most important problem presents itself for consideration in the decision as to whether the houses are to be sold to the workingmen or rented them. No general answer can be given to this question, but a brief statement of the pros and cons can here be given.

If the houses are sold to the workmen, there is the objection that if the workmen are fired or leave of their own accord they still retain the house though it is wanted for other workmen; also that if they can sell at a profit, the increment in value which has been put into the house by the presence of the plant goes to the workman, who has not earned it. On the other hand the workman buying his own home and paying for it by installments has to make himself a steady and efficient worker in order to keep up his payments. There are usually more applications to purchase than there are houses to sell. Therefore the purchasers can be selected from those that are the most likely to remain with the company. The difficulty of firing men is not a pressing one, as the manufacturer's problem to-day is rather how to hold his men than how to fire them. The employment manager is being kept busy finding new places for men who do not fit in one corner of the plant rather than let them be fired in the old way.

Where houses are rented the owner has more control over them, and can evict tenants who leave his employ. He has, however, the difficulty in strike times of taking care of his property, which otherwise would not concern him.

Labor leaders object to the immobility of labor caused by men owning their homes.

The tendency seems to be to-day toward the selling of the houses, and several interesting purchase schemes have been evolved by manufacturers.

Supervision

If a housing project is to be really successful, too much emphasis cannot be laid on the strict and careful supervision and education of the tenants. Overcrowding and the lodger evil must be prevented by proper restrictions in the leasing or selling of the property, and a welfare worker or district nurse or friendly rent collector should make periodical inspections for the purpose of seeing that the premises are being kept clean and that the tenants are living decently. It is not essential that this worker be engaged directly by the owner of the houses. In many cases it is far better if the local municipal league or other local organization can be subsidized to take care of these activities.

A welfare worker can often accomplish a great deal in the way of educating the foreigner along sanitary and decent housekeeping lines.

An interesting experiment which is about to be tried is the establishment of a "probationer's" block on the outskirts of a new industrial town. To this block are admitted tenants of negro or foreign birth, and their housekeeping is supervised by a resident superintendent. They are taught American cooking, laundry work, etc., in a welfare building, and when they have proved themselves to be good tenants and agreeable neighbors they are permitted to occupy houses in other parts of the town. This experiment will be watched with a good deal of interest.

Conclusion

In this article the writer has endeavored to touch upon the many problems that are still being studied by those who have the welfare of the workmen and the manufacturer at heart. It cannot be stated that any of these problems have yet been finally and satisfactorily solved. All that it is hoped to accomplish in this article is to set forth clearly the main problems in a desire to assist the manufacturer starting a housing venture to form a correct judgment for himself.

Drum Reversing Switch for Machine Tools

For operating the driving motors of machine tools and wood-working machinery where it is necessary to reverse the direction of the rotation the Westinghouse Electric Mfg. Co., East Pittsburgh, Pa., has brought out a small reversing switch of the drum type. The switch is made for use on either direct or alternating current circuits and its small size enables it to be mounted directly on the machines.

The back of the switch is formed by a terminal board of heavy micarta with the stationary contacts mounted on the front. The movable contact segments are mounted on cast brass brackets which are thoroughly insulated from the revolving shaft to which they are clamped. Phosphor bronze springs are provided on the movable segments to secure good contact, copper shunts being provided for their protection. Adjacent sets of contacts are separated by asbestos lumber barriers which are relied upon to prevent cross-arcing. A sheet steel cover lined with asbestos and held in place by two ring latches protects the live parts and at the same time can be removed readily to inspect or renew the contacts.

Arcing between Adjacent Rows of Contacts of a New Reversing Switch of the Drum Type for Machine Tools Is Prevented by Barriers of Asbestos Lumber

When the controllers are intended for operation on alternating-current circuits or on direct-current circuits without dynamic braking, only three positions are provided for forward and reverse operation and a neutral point. For the former class of service the motor is connected directly across the line. Where dynamic braking is employed in connection with direct-current motors, two additional drifting positions are provided on either side of the central off and braking one. The switch may be used with automatic starters for shunt and compound wound motors and with the latter where a heavy series winding for tailstock and cross-rail service is provided the motor can be connected directly to the line, either with or without resistance permanently connected in series with the armature. If it is desired to use remote mechanical control of the switches for any reason an extended shaft permitting of either gear or chain and sprocket operation can be supplied for both types.

The Goulds Mfg. Co., Seneca Falls, N. Y., manufacturer of pumps, will put into effect beginning Jan. 1, 1918, a bonus system whereby all hourly, piece work and salaried employees rated at $40 a week or under, will receive quarterly, a bonus of 10 per cent on their total salary for the previous three months. This bonus is contingent upon a stipulated amount of time being put in at actual work during the year, and is aimed to encourage full-time work.

The French Purchasing Commission announces that it has removed its offices from 10 Bridge Street to the American Express Building, 65 Broadway, New York.

Economies in Burning Blast-Furnace Gas

Data from Steel-Plant Boiler Room Practice and Tests—Characteristics of Various Burners and Means to Better Boiler Efficiency

METHODS of burning blast-furnace gas under boilers were discussed some months ago before the Engineers' Society of Western Pennsylvania. Data from tests and from operating practices of various steel plants showing efficiencies, stack temperatures, flue-gas compositions, etc., were given. A discussion of gas burners by Herman C. Siebert, experimental engineer, Duquesne Works, Carnegie Steel Co., Duquesne, Pa., included the characteristics of various types and indicated, by data from tests on each, conditions for best economy and a co-ordinate influence of gas pressure, air supply and design on this.

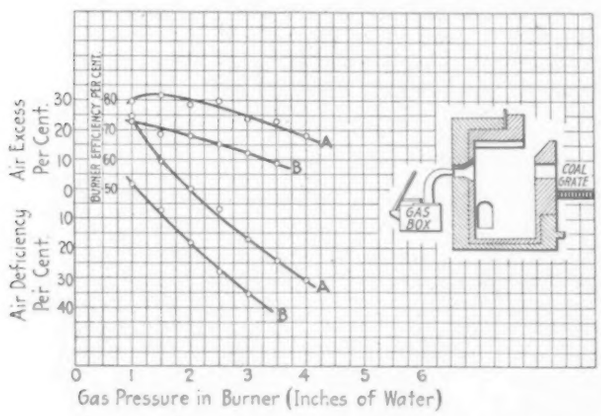


Fig. 1—Burner Efficiencies and Air Aspirating Characteristics of Kennedy Blast-Furnace Gas Burners. Curves *A* were obtained when the air openings around the burner nozzle were wide open and curves *B* when these were partly closed. Gas pressures at which no excess air was found were 2 in. of water for the former condition and 1 in. for the latter

Economies in Practice.

Frank E. Leahy gave operating characteristics of the boiler plant at the blast furnaces of the National Works, National Tube Co., McKeesport, Pa., where he is steam and hydraulic engineer. The blast-furnace plant at the National Works consists of four furnaces and 17 stoves. The gas from three furnaces is passed through Brassert dry cleaners and the gas from the fourth receives no dry cleaning but passes into the same main as the dry cleaned gas. An approximate heat balance of the gas found in useful work figured from the monthly report shows: Boilers, 58.26 per cent; stoves, 26.21; gas engines, 2.87, and unaccounted for 12.66 per cent.

The boiler plant has 11,600 boiler h.p. of Babcock & Wilcox and Aultman & Taylor boilers located in two houses designated A and B. Each boiler is equipped with two stationary burners of the common box type, overhead construction, with a Wilson bell valve, to control the supply of gas to the burners. The burners are set central in the box and placed to give the maximum aspirating effect with about 0.05 in. of water suction in the firebox.

During the month of October, 1916, the following practice was obtained:

	Boiler House A	Boiler House B
Boiler capacity in operation, boiler h.p.	6,436	4,245
Capacity developed boiler h.p.	7,778	5,217
Rating developed by capacity in operation, per cent	118.5	120.7
High rate of evaporation for four consecutive hours, per cent	122.7	148.8

No coal is fired under these boilers but in case of shortage of gas, steam is supplied from a coal-fired boiler house to take care of such periods. Over a month the equivalent of 1200 to 1400 boiler h.p. is required from this source to maintain operation. During delays due to castings, etc., draft is at times completely checked, which enables maintenance of a temperature in the fire box sufficient to ignite the gas when it is available.

A test on one of the gas-fired boilers in boiler house B burning furnace gas was made by A. N. Diehl in 1915.

The following is a summary of the results:

Rating developed, per cent	135
Maximum efficiency, per cent	75.0
Minimum efficiency, per cent	70.0
Average efficiency, per cent	72.3

This test was run on a boiler in service and operated by the regular fireman so as to get the results under actual operating conditions.

Suggesting that conditions met with in tests made by him six years ago on blast-furnace boilers using both clean and unclean gas are probably representative of those encountered by master mechanics and boiler foremen in many present-day plants, F. H. Wilcox, Bureau of Mines, Pittsburgh, described the results of these tests and the difficulties to which attempted improvements led, concluding that it was virtually impossible for the average blast-furnace boiler force to control combustion with the ordinary type of burner and in addition regulate the draft and keep the settings in fair shape.

The tests were made on 250-h.p. Babcock & Wilcox boilers each equipped with two Kennedy type gooseneck burners with a gas inlet area of about 185 sq. in. The openings about the burners, into the combustion chamber, had been closed up with sheet iron fitted closely about the burner castings, which allowed insufficient air to enter with the gas. Also the boiler settings were full of leaks. The first four or five tests were made with the boilers as they stood and, he said, gave consistently bad results running from 48 to 54 per cent

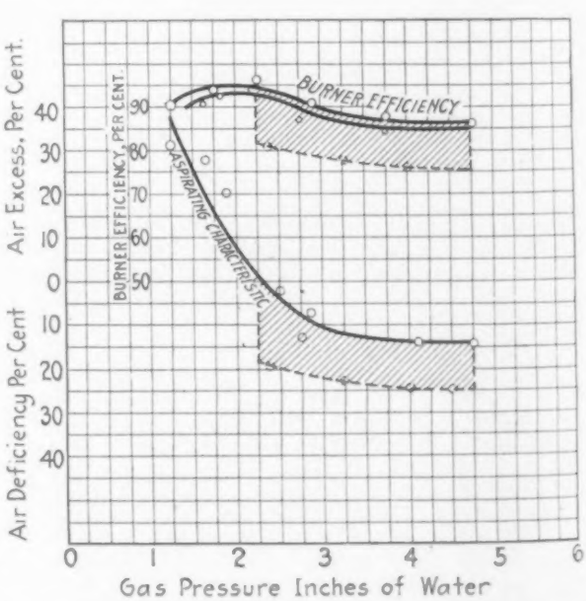


Fig. 2—The Upper Full-Line Efficiency Curve is for the Weidlien Gas Burner, the Other Being for the Fraser Burner. The aspirating characteristic curves of the two coincide. Characteristics of the Weidlien burner were obtained with the primary air ports 3 in. open and the secondary air ports wide open. Those for the Fraser burner were obtained with the primary air ports wide open and the secondary air ports closed. The shaded areas show the decrease in efficiency and air supply occurring when the secondary air ports of the Weidlien burner were closed. Characteristics of the Kling and Bradshaw burners are similar to these

efficiency, with losses due to incomplete combustion as high as 20 per cent. The sheet iron was removed and all leaks were plugged with fire clay, asbestos rope and cement. The result, however, of work with uncleaned gas proved that consistently high efficiencies could not be obtained. As high as 70 per cent on an 8-hr. test was obtained, but average efficiency of boiler and burner using rough gas was about 58 per cent.

He found that with boilers in use for three or four weeks clean gas gave 64 per cent efficiency while unclean gas gave 58 per cent. Results were also more easily duplicated using clean gas. However, he found that after operating charges for cleaning were properly made a net loss of 4 cents per ton of iron was entailed using clean gas.

J. A. Knesche, steam engineer and engineer of tests, National Tube Co., Wheeling, W. Va., stated that a well-managed boiler house where the boilers are fired with blast-furnace gas the average monthly analysis for the entire boiler plant should be CO_2, 20 per cent or more; O_2, 2 per cent or less; CO, no trace and stack gas temperature at full rating 600 deg. Fahr. or less. This he held will give an efficiency of 70 per cent or more.

Mixed Coal and Gas Firing.

Conditions for coal firing and gas firing are so essentially different, according to S. G. Brigel, secretary, Huessener Engineering Co., Oliver Building, Pittsburgh, that they should not be mixed in the same furnace. Comparative analyses of the straight gas firing and mixed coal and gas firing, using Parsons blowers, have shown that an analysis of 24 per cent CO_2, 0.2 per cent O_2 and no CO was instantly changed when mixed firing was resorted to into 16 per cent CO_2 with varying amounts of oxygen, and of unburnt CO ranging up to 5 per cent. In the case of insufficient gas, he said it will pay to shut a number of boilers off gas and put them on coal firing.

With unclean furnace gas he held it uneconomical to go over 150 per cent rating, as above this he said it is difficult to keep the boiler clean from dust or scale during operation. Where unclean gas is used, no boiler should be allowed to run longer than 30 days without cleaning.

Gas-Burner Characteristics.

Herman C. Siebert gave charts of results obtained from a number of experiments with various burners used in connection with different boilers at the Duquesne Works of the Carnegie Steel Co. The common type of burner as applied at this plant, he said, is in use in most blast-furnace plants and is shown in Fig. 1. An auxiliary bridge wall in the furnace and a coal grate between it and the main bridge wall is used in connection with this burner at the Duquesne Works. Also, a metal screen permits varying the air opening between boiler and burner. Its characteristics as determined are shown in the figure, which indicates that the proper amount of air is aspirated at a pressure of 2 in.

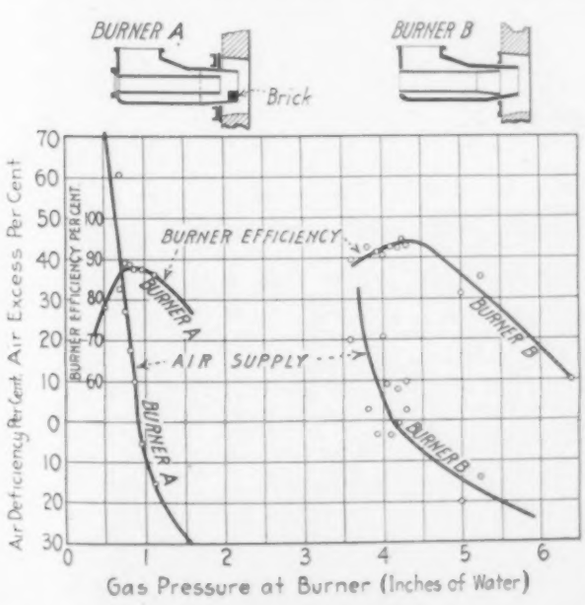


Fig. 4—Burner A Is Limited to a Low Gas Pressure because of Its Large Gas-Port Area, while Burner B with a Smaller Gas Port Is Properly Operated at a Considerably Higher Pressure. The temperature of combustion for burner A was 1500 deg. Fahr. and for burner B 1970 deg. and the ratios of the loads developed by each to the boiler's rated capacity were respectively 90 per cent and 157 per cent. The net areas of the air and the gas ports of burner A were respectively 7.52 and 4.8 sq. ft. and those for burner B were 5.54 and 1.17 sq. ft. The secondary air ports of A were open during the tests and their area was included in the port area while those of burner B were closed and so their area was not included

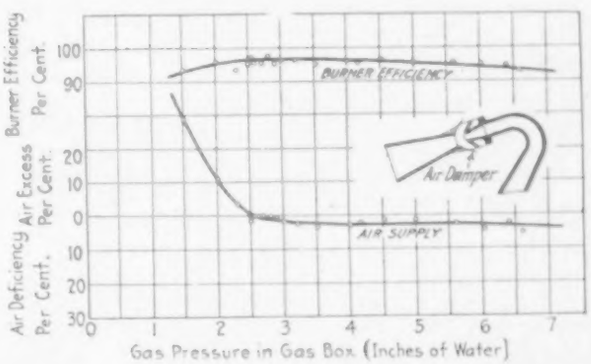

Burner Efficiency Per Cent.
BURNER EFFICIENCY
Air Damper
AIR SUPPLY
Air Deficiency Per Cent. Air Excess Per Cent.
Gas Pressure in Gas Box (Inches of Water)

Fig. 3—This Efficiency Curve of the Burner Shown Was Obtained by Regulating the Air Supply so that for any Gas Pressure a Proper Mixture of Gas and Air Was Obtained. The air dampers were adjusted until gas analyses showed that the desired amount of air was being aspirated. Aspirating a quantity of air proper for any gas pressure is seen to be a matter of proper air-port area

when the screen is open and at 1 in. when it is closed. He pointed out that at all other gas pressures the air supply is positive or negative in amount of excess.

Characteristics for certain types of aspirating burners, such as the Bradshaw, Kling, Weidlien and Fraser, shown in Fig 2, he said, are similar to those of this burner except that it aspirates the proper amount of air at a different gas pressure. The feature of aspirating the proper quantity of air at any gas pressure, he held, is merely a question of proper port area.

In Fig. 3 he shows the characteristics of the burner shown, which he explained indicates what can be accomplished in the way of air supply if the port area is large enough and is varied to suit different gas pressures. In this case the air supply was controlled by gas analyses taken from the combustion chamber and the port area varied accordingly.

In Fig. 4 he shows characteristics of the burners shown. He explained that burner A was limited to a low gas pressure on account of the large gas-port area, while burner B, with a smaller gas-port, could be operated at a higher pressure. The temperature of combustion for burner A was 1500 deg. Fahr. and for burner B 1970 deg. Fahr. The boiler ratings developed were 90 and 157 per cent respectively (90 per cent rating having been developed by burner A as used originally, i. e., before gas-port area was reduced, as shown by cross-section lines in figure). The draft in the air pipes of burner A was 0.2 and in burner B 0.75 in. of water. Four burners supplied an 823-h.p. Stirling boiler.

He made some experiments on the mixing burner shown in Fig. 5. An explosive mixture which left the nozzle at a velocity greater than the ignition velocity was burned. This type of burner installed on a Babcock & Wilcox boiler developed 270 per cent of the boiler's rated capacity. The maximum efficiency was about 68 per cent, the average being 64 to 65 per cent.

With this burner temperatures of combustion were developed up to 2250 deg. Fahr. with both large and small chambers. The gas pressure was anywhere from 2 to 8 in. of water. For a high gas pressure he introduced a relatively large amount of air, and for low gas pressure he throttled the air, always to suit the conditions of best combustion as indicated by the analyses in the combustion chamber. The air pressure was 3 in. at the fan. At the burner it was about 2½ in. Normal pressure varying from 1 in. to 1⅛ in. was obtained in the mixing chamber of the burner. The stack draft in the combustion chamber was small, never more than 0.10 in. of water. No difficulty was experienced with

flue dust, but every 24 hr. a fireman put in the regular steam nozzle and blew out the dust as best he could.

Mr. Brigel said that when he runs a gas fired boiler equipped with Bradshaw burners he always seals the boilers against all air and relies on primary air only. He has found that air infiltration, say a foot below the burner, in the front of the combustion chamber proved detrimental, frequently reducing the combustion temperature to such an extent that incomplete combustion took place with an excess of oxygen. Two boilers, one equipped with a burner working only with secondary air, the other with a burner working only with primary air, he said were tested side by side after they had been adjusted so that both showed 22 per cent CO_2, 1.0 per cent oxygen and no CO in the combustion chamber. Three successive tests showed that change of gas pressure in the boiler utilizing only primary air reduced the CO_2 to 19 per cent, without any CO, while in the boiler working with secondary air CO_2 as low as 17 per cent, with 6 per cent CO, was obtained. He has found that as a rule a suction of 0.20 in. of water takes care of all fluctuations in gas pressure within reason.

Effect of Dirty Tubes.

H. C. Cronemeyer, engineering department, Jones & Laughlin Steel Co., Woodlawn, Pa., cited the results of a 48-hr. observation on a vertical water-tube boiler, during which hourly readings were taken of the temperature of the escaping gases to determine the influence of soot. For the first 24 hr. there was an approximately uniform rise of about 6 deg. Fahr. per hr. After that the temperature fluctuated over a range of about 60 deg. Fahr. as the accumulations of dust dropped off and built up again. The temperature at the end of the 48-hr. period was 160 deg. Fahr. higher than when the observations commenced with clean tubes. He has knowledge of a case where the gradual building up of dust against a drum caused a small movement toward one side during every heating up after a shutdown. The cumulative effect of this he believes would have pushed the drum off of its support, had not this condition been discovered during alterations on the setting.

Influence of Boiler Design.

By building a curtain wall across the combustion chamber, compelling the flame to travel downward before rising again among the tubes thereby increasing the length of travel and time for combustion, a 400-h.p. boiler he said was operated at 145 per cent rating at good efficiency. With dirty gas this introduced a disagreeable complication as the flue dust carried by the gas fused on the walls of the combustion chamber. He favors a three-pass boiler to a two-pass one and knows of an instance where the temperature of the stack gases from a two-pass vertical boiler was reduced 85 deg. Fahr. by the insertion of three tiers of cast-iron horizontal baffles in the second pass, which caused the gases to zig zag across the tubes and lengthened the time of contact. A boiler fired with dirty gas, he believes, should be taken out of service for cleaning about every 12 to 15 days.

Mr. Brigel held that boiler design has a decided influence on efficiency. He has run a number of tests on Babcock & Wilcox, Rust and Stirling boilers and concludes that from a gas firing point of view the Babcock & Wilcox boiler is the best heat absorber and allows the highest overload without undue loss of efficiency. The Rust and Stirling boilers appear to have approximately the same capacity for heat absorption, but he prefers the Rust boiler, since the one large baffle in the Rust boiler, he said, is more substantially built and more easily kept in repair than the three baffles in the Stirling boiler.

Running Stirling boilers on loads varying from 130 to 160 per cent he has found stack temperatures for complete combustion with low excess of air of between 600 and 650 deg. Fahr. and in the case of Rust boilers, similar temperatures. On the other hand, a large number of figures taken during regular operation on over 100 Babcock & Wilcox boilers fired by gas exclusively showed stack temperatures ranging from 530 deg. Fahr. to 600 deg. Fahr. for an average load of 165 per cent. With good combustion conditions and airtight boiler settings, the stack temperatures were for all three types of boilers in the neighborhood of 500 deg. Fahr. for loads between 90 and 100 per cent.

Mr. Knesche said that he has recently conducted tests on Stirling boilers rated at 282 boiler h.p. using blast-furnace gas. Two of the boilers had vertically descending baffle arches built in at the ends of the regular furnace arches and the others did not have these arches. The purpose of the tests was to determine whether the arches improved economy. The baffle arches were built of brick about 5 ft. back from the gas burners and they descended toward the center of the arch a distance of 23 in. from the inside of the furnace arch.

Not long after the gas had been lighted the interior of the furnace became almost incandescent in glow and the heat he believes would have melted the grate bars had they been in place. The whole of the combustion chamber was a mass of turbulent and partially reverberating flames and the heat within it was so intense that the inside of the unlined ash pit and firing doors remained in a state of bright red heat during the entire duration of the test.

The two boilers fitted with baffle arches are designated group B, the others group A. During the test the ash pit doors and the firing doors were sealed with fire clay and the air necessary for the combustion entered the combustion chamber through a large annular air-port surrounding each gas burner. The nozzle opening of each burner was 3 11/16 in., and the gas entered each boiler through 10 of these burners.

Test to Determine Effect of Baffle Arches

Duration	5 hr. 44 min.
Total feedwater to groups A and B	56,300 gal.
Steam per hour from group B	19,550 lb.
Gas pressure	3.51 in. H_2O
Draft pressure	.03 in. H_2O
Steam gage pressure, group A	156 lb.
Steam gage pressure, group B	133 lb.
Feedwater temperature	194 deg. Fahr.
Capacity developed, group A	93.08 per cent
Capacity developed, group B	106.99 per cent

Flue Gas Analyses (Group B)

	Boiler No. 11	Boiler No. 12
CO_2 per cent	14.35	11.30
CO per cent	Zero	Zero
O_2 per cent	11.30	9.35
Stack temperature deg. Fahr.	714	747

The side and rear walls of the boiler setting he said were practically new at the time of making the test, but the front wall underneath a cast iron boiler front, and therefore invisible unless inspected from within, contained holes through which he believes air must have entered in large volumes.

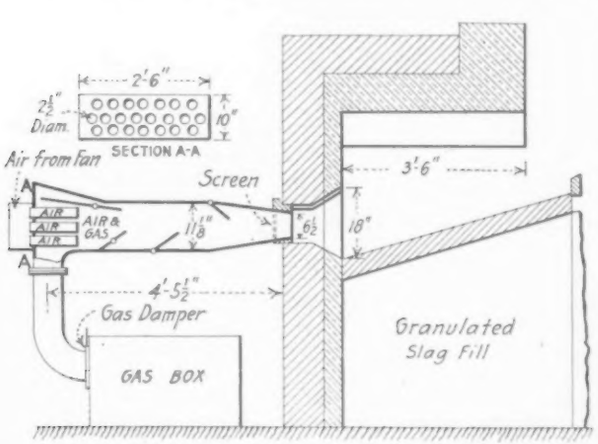


Fig. 5—An Explosive Mixture which Left the Nozzle at a Velocity Greater than Ignition Velocity Was Burned in this Burner, 270 Per Cent of the Boiler's Rated Capacity Being Developed

The Keasby & Mattison Co., Ambler, Pa., has commenced the construction of a series of 200 six-room dwellings for employees. A first block of 49 houses is now in course of erection and work will soon be inaugurated upon a second allotment of 35 homes.

Mill Employees' Lunchrooms

In a paper read before the iron and steel section of the recent congress of the National Safety Council, J. P. Eib, supervisor of safety and labor at the Joliet works of the Illinois Steel Co., Joliet, Ill., described the growth of this phase of the welfare work at that plant from 1911, when a committee was appointed to work out the details of installing a small lunch counter. This was installed on Jan. 1, 1912, as an experiment to see whether it would stop noon hour drinking among the employees. It had a capacity to serve about 500 men per day and within a few weeks from two to three times that number were being accommodated.

A new building 30 x 400 ft. was erected that year to house a lunchroom which was conducted on the cafeteria plan. The seating capacity is 132 and between 11 a.m. and 12.30 p.m. there is an average daily attendance of over 400, with approximately 2000 employees patronizing the restaurant every 24 hr. While the lunchroom is not run for profit, the end is to make it self-sustaining, the profit on the sale of cigars, tobacco, candy, ice cream, soft drinks and other so-called luxuries at retail prices giving a profit which helps to offset the loss on the basic articles of the menu. The experience at Joliet was so successful that three plant lunchrooms are now in operation at the South Works, Chicago, and one is under construction at the Gary plant.

In discussing the advantages of washrooms and change-houses, Mr. Eib pointed out that they tended to prevent disease, promote self-respect and loyalty and made factory work attractive. The buildings should be located in convenient places and it is desirable to install the washroom in the same building as the locker room, and the two should be separated by a partition. The buildings should be open to outside light and air and should be of fire-resisting construction, and the floor should be of concrete or non-absorbent material, a slope being provided toward the drain. This preferably should be located under the plumbing fixtures, as in this way the water will run toward and not away from the fixture, thus materially improving the appearance of the room. He recommended that the men of necessity wash their hands and faces from a flowing stream and the number of faucets should not be less than one to every six of the maximum number of employees of a single turn. The lockers should be of steel not less than 12 x 16 in. in plan and should be at least 4 in. above the floor. The shower baths should be separated by partitions and the number should not be less than one to every 25 employees, based upon the maximum number employed on a single turn. It was his experience that the failure of the men to use washing facilities was largely due to crude, antiquated and uninviting facilities and that the men would use a clean room with warm water and adequate facilities if it were provided.

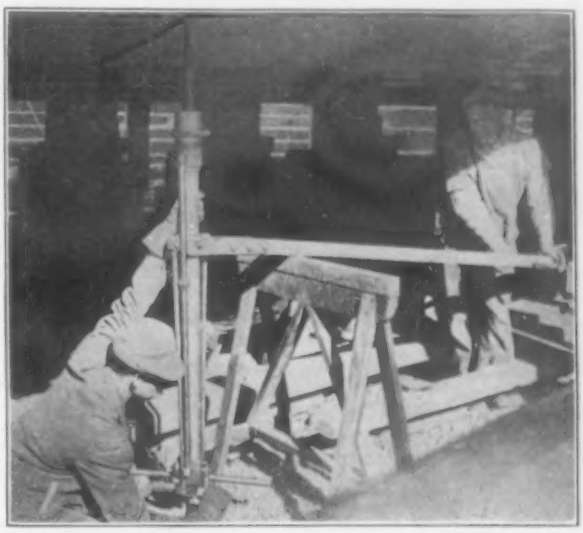
The Plague of Committees

In response to numerous requests, the British Board of Trade Intelligence Department has published a list of "*some* of the ministries, departments, commissions, and committees which have been established since the beginning of the war to deal with matters affecting trade." The London *Economist* says: "The list is an appalling one. It comprises approximately 140 committees, six commissions, four ministries, 16 departments, three advisory boards, three ordinary boards, two executives, two panels, one registry, one commissioner, and one clearing-house. We say approximately, because the Board of Trade Intelligence Department itself says that the list is only 'some of the committees, etc.,' and new ones are probably being set up every other day. The publication of this list is long overdue. The need for it has for some time been very keenly felt, and doubtless many traders have, like ourselves, endeavored to keep a more or less complete list for their own convenience and reference, but despite the utmost care and alertness, it is doubtful if the list of any private individual approaches the enormous proportions of that just published by the Board of Trade. Moreover, it is probable that had such a list been in existence from an early date and kept thoroughly revised and up to date, many of the committees, etc., which have been appointed would not have been appointed; but in the absence of such a list it was not clearly known what bodies were already in existence, and so, with the cropping up of any new matter to be dealt with, a new committee was immediately appointed, irrespective of the fact that an existing committee, or sub-committee of same, would have been quite competent to deal with the matter.

"This is abundantly illustrated by a careful analysis of this extraordinary list. In regard to shipping alone there are about 25 committees. In addition to a Diverted Cargoes Committee, there is also a Delay in Unloading Cargoes Committee and a Tonnage Priority Committee. The ordinary lay and unofficial mind might be permitted to wonder why one committee should not have sufficed to deal with cargoes: if necessary, sub-committees could have been appointed. The same might be said in scores of other cases."

Removing Countersunk Rivets Rapidly

An interesting application of a pneumatic device made by the Rivet Cutting Gun Co., 220 East Second Street, Cincinnati, is its use for punching out countersunk rivets from the bottom and sides of ships. This



Countersunk Rivets Are Removed Rapidly by Punching Through Them Instead of Digging Out the Head

pneumatic tool, which was illustrated in THE IRON AGE, March 15, 1917, is operated by three men and consists of an elongated cylinder in which there is a piston mounted on slides.

The tool was originally developed for cutting off rivet heads, after which the rivets can be backed out with a single blow. Where the rivet has countersunk heads the back-out bar is placed against the head and the latter punched through, the bar being carried in a cup-shaped casting provided at the end of the cylinder. The shank of this bar passes through the casting and projects into the lower end of the cylinder. In this way it is emphasized that the rivet can be removed in one-tenth the time it takes to dig the countersunk head out of the rivet. The output of a crew of three men with one of these tools is said to be as great as a gang four times as large equipped with cutting bars and sledges. The number of rivets that can be cut per minute varies from 14 having a diameter of ⅞ in. to four that are 1¼ in. in diameter.

The Chemical Steel Co., whose recent formation was noted in THE IRON AGE, has selected a site near Granite City in Illinois, opposite St. Louis, for the construction and equipment of its plant in which Illinois coal will be, by a new process, converted into coke. Other plans of the company include chemical plants, a blast furnace and dye plants.

Inefficiency in the Boiler Room

In a paper read before the American Society of Mechanical Engineers at its annual meeting in New York, Dec. 5, David M. Myers, consulting engineer, Griggs & Myers, New York, urged that educational propaganda be carried on extending to men who run boiler plants information on proper operating methods. Considerable saving in fuel, ordinarily wasted through inefficiency, he believes eventually would be saved in this way.

Preventable waste of fuel in the boiler furnace of one steel mill which he investigated amounted to 40,000 tons per year. This was a comparatively modern plant. The efficiency of boilers and furnaces in a 14-day test was 55 per cent. The load factor was unusually favorable to high efficiency and could readily be raised to 70 per cent or over. In one hand-fired plant the evaporation was raised from 6 to 9 lb. in a few days of instruction and continuously kept close to this higher mark with the help of coal and water measurements which were inaugurated. The saving, he emphasized, was due exclusively to instruction and consequent better operation.

Six hundred million tons of coal were mined in the United States last year, and he predicted that 700,000,000 tons will be mined this year. Of this quantity he estimates 67 per cent, or 469,000,000 tons, will be burned for steam-making purposes on land, assuming the same percentage consumption for steam production as existed in the year 1915. The saving or wasting of one-quarter of this coal, that is, over 117,000,000 tons, depends upon the efficiency with which we operate our boiler furnaces. In 16 years of concentrated study in the investigation and improvement of steam and fuel conditions in factory power plants, he has never visited a plant of this class where a saving in coal of at least 10 to 12 per cent could not easily be made. Hundreds of boiler plants, he said, operate at no greater than 58.07 per cent efficiency and he believes it a comparatively simple matter to bring them up to an efficiency of 70 per cent or higher, a saving of over 17 per cent of the coal. It is his opinion that the average saving of 10.65 per cent, corresponding to 1,000,000 fifty-ton carloads per year, is a conservative estimate of what can be accomplished by a well-directed and properly organized movement in the direction he proposes.

Will Make Naval Guns

The Poole Engineering & Machine Co. of Baltimore is having a 100 x 500 ft. building constructed of steel frame and brick for the manufacture of 4-in. naval guns for the Government, and deliveries are expected to begin in May. The plant will employ about 350 men and the capacity will be three guns every two days. The equipment has been contracted for and is expected to be delivered shortly. However, the company is in the market for planers and both vertical and horizontal boring mills. The new building will cost about $500,000 and is being constructed by the H. B. Watts Co., Garrett Building. W. H. Emery is the architect and the G. E. Painter Co. the engineer. S. Proctor Brady is president of the Poole Company and Robert P. Allison the general manager.

Notification has been received in St. Louis that the United States Shipping Board has allotted the sum of $3,500,000 for the construction of 24 barges and four tow boats to be utilized in river traffic between St. Louis and St. Paul, for the purpose of transporting coal north and iron ore south from the Minnesota and other northern mines to the blast furnace in operation at St. Louis. In order that the barges and towboats may be built at St. Louis, the St. Louis Chamber of Commerce members have undertaken the formation of a corporation of about $3,500,000 capital.

The offices of Gannestad & Jacobsen, engineers, have been removed from the Benedum-Trees Building to new and larger quarters at 1103-1106 B. F. Jones Building, Third Avenue and Rose Street, Pittsburgh.

Oxy-Acetylene Cast-Iron Welds

Opinions that oxy-acetylene welds are hard and brittle and cannot be machined, also, that in cast iron they have no particular strength are erroneous according to a paper presented by Stuart Plumley, Davis-Bournonville Co., Boston, before the American Foundrymen's Association at its annual meeting Sept. 25. These opinions, he said, result from use of poor filling rods and of a variety of apparatus which on the whole is improperly designed and constructed.

For iron castings the parts should be prepared by cutting away the edges to be welded to an angle of 45 deg. on each side to permit the operator to start at the bottom of the broken section. It is, also, usually best to place the casting in a rough brick enclosure so the heat may be properly confined. Silicon in cast iron tends to promote the formation of graphite making the iron soft. Manganese and sulphur on the other hand have the opposite effect. Cast-iron welding rods, therefore, should be high in silicon and the grade of iron used must be the best. The rod must be cast in a heated metal mold in such manner that it is free from sand and is not chilled on the surface. Use of welding rods low in silicon and high in manganese and sulphur tends to produce white or chilled iron, containing no graphitic carbon, making the weld intensely hard. The manufacture of good welding rods cannot be carried out in the ordinary foundry, as the iron is not suitable for the purpose. Use of a small quantity of flux is, also, effective.

The cast-iron leg of a steam hammer was broken completely off and repaired by welding. The break occurred on a Tuesday morning. On Tuesday afternoon preparation of the casting began. It was necessary to chip or "V" the break clear around the leg. Welding was started on the following Friday and completed on Saturday night. The hammer was assembled Monday morning and put in operation the following Wednesday morning. It has been working day and night since the break was repaired. The repair required in all 16 ft. of welding in cast iron ranging from 2 to 3 in. thick; 2000 cu. ft. of oxygen and about 1800 cu. ft. of acetylene were consumed. The welding required the services of four men, each relieving the other. The break was inclosed in a rough brick furnace and the heat was confined and the temperature maintained uniformly. Preheating was accomplished with large fuel-oil burners.

Stock List of Conveying-Machinery Parts

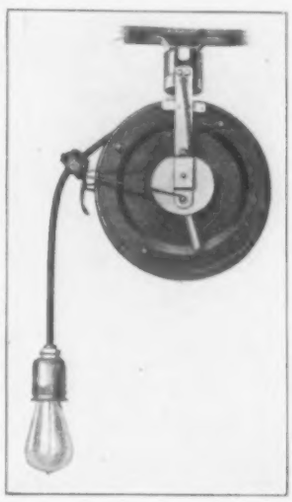
The Jeffrey Mfg. Co. Columbus, Ohio, has begun the publication of a semi-monthly stock list covering its line of elevating, conveying and power transmission machinery. The available amounts of chains and attachments for elevators and conveyors, malleable iron and steel elevator buckets, belt and spiral conveyors and fittings, take-ups, bearings, hangers, pulleys, etc., are given together with the approximate shipping dates for the various lines. References are made to the pages in the company's latest catalog on which the different equipment is illustrated and described. The sizes which are recommended for all new equipment and for replacements and repairs where possible are indicated in heavy type with a view to enabling the purchaser to secure prompt shipment as well as eliminating the extra cost that is necessary when special equipment has to be manufactured.

The Kansas, Colorado & Oklahoma Railroad was sold under foreclosure at Scott City, Kan., Saturday, Dec. 15, to the Hyman-Michaels Co. of Chicago for $318,000, an unprecedented price for a road which is to be torn up and resold as second-hand material. The road is about 50 miles long, running east from Scott City, and was sold under the order of court to meet its indebtedness. The sale included 50 miles of 70 lb. steel rails, standard section; two locomotives, three flat cars, two box cars, two coaches, 80 acres of land and 500 town lots. The right of way reverts to the farmers and others originally granting it to the railroad, which was a financial failure.

Automatic Drop Light Extension Reel

An automatic electric drop light extension reel is being made by the Cincinnati Specialty Mfg. Co., Powers and Sylvan streets, Cincinnati. A swivel joint is provided that enables one to walk in any direction with the lamp. The cord furnished with the outfit is 25 ft. long and is automatically wound over the pulley by a spring inside the pulley.

The reel is automatically stopped at any point by allowing the line to drop back slowly so that the automatic catch drops over a pin that locks the pulley. The cord is released from the catch, or lock, by pulling it forward and letting it be drawn back by a spring. Ordinarily the reel is attached to the ceiling with screws and a connection made to the line wires in the usual manner, or it is attached to the outlet box, for which a special cover is furnished, when the conduit system of wiring is used. The electric current passes in at the reel head, where brush connections are used in order not to interfere with the operation of the swivel joint.



A Spring Actuated Automatic Reel Enables an Ordinary Electric Drop Light to Be Used Within a Radius of 25 Ft. of the Outlet and at the Same Time Keeps the Cord Clear of the Floor

The pulley disk is of black enameled metal and the other parts are of polished nickel. The manufacturer claims that this device is especially useful in a garage or shop, as it enables repairs to be made on machines without having to place them at any particular spot. A strong wire guard is fitted over the globe.

Graduating Machine for Circular Work

The line of marking machines developed by the Noble & Westbrook Mfg. Co., Hartford, Conn., has been increased by a special machine for marking the graduations and figures on circular and semi-circular metal parts. Among the work which it is designed to do is the graduating of compound rests for lathes and for performing various other operations of a similar nature on steel products.

Compound Rests for Lathes and Other Forms of Semi-Circular and Circular Work Can Be Marked by a Recently Developed Special Graduating Machine

The die which does the graduating is held in a holder and is keyed to a shaft which runs in bronze bearings provided with a collar adjustment. Cut gears are employed to hold the work in place with relation to the die. The work and the die are brought in contact by a lever actuated by the operator's foot and a cam. The latter is adjustable so that it is possible to regulate the depth of the impression to 0.01 in., thus giving an even and accurate impression, one piece being produced at each turn of the handle.

Crane and Chain Practice

The covering of all gears on traveling cranes as well as the providing of ample platforms with railings and toe-boards and the installation of bumpers and rail stops to prevent running over the rail ends were recommended in a paper presented by G. A. Orth, chief adjuster, claim and safety department, American Car & Foundry Co., St. Louis, at the recent convention of the National Safety Council. He stated that the trains of gears should be protected and guarded to prevent gears, which become broken or loose from defective or loose keys, from falling on the men below, and the bearings should be rebabbitted and aligned to prevent them from wearing out of mesh, as wear is the cause of accidents when the teeth get the load and strain on their points. The lining and rods on the band brake should be examined regularly, and he considered that dynamic braking used in connection with a holding brake was the most desirable and safest method of controlling a descending load. Traveling cranes should be inspected regularly and frequently to counteract the effect of wear and tear, collisions, neglected lubrication and to keep the diameter of the track wheels the same so that they will travel in parallel lines on their tracks. The use of safety appliances on these cranes will enable men to work under them and be free from any feeling of danger, and thus the amount of work secured from them would be increased. In concluding the paper, Mr. Orth recommended that the standards based on the specifications of the United States Steel Corporation be adopted for overhead traveling cranes.

A patent (U. S. 1,247,606) has been awarded to Milton A. Smith of Vandergrift, Pa., which provides a method of tapping open-hearth furnaces so as to prevent the slag from mixing with the metal as it flows from the furnace into the ladle.

Peerless Truck and Motor Report

The ten months report of the Peerless Truck & Motor Corporation, Cleveland, for the period ended Oct. 31, shows net profits of $1,992,413, equal to approximately $10 a share. This is at the annual rate of about $12 a share. The company's consolidated balance sheet discloses an excellent current asset position. Of the total current assets of $8,583,520, cash in the bank is represented by $2,450,904. Current liabilities are $1,557,262, leaving a net working capital of $7,026,258. This does not inclued the $2,500,000 received in payment for the company's Long Island plant, sold recently to the Government. This sum added to the working capital provides the company with excess current assets of $9,526,258. Such an amount would permit the company to pay off its $5,000,000 of notes and there would still remain $4,526,258, equal to $22.60 a share. The stock is now selling around $11 a share. Gross sales for the period were $17,013,113 as compared to sales $16,621,038 for the entire 12 months of 1916. A surplus of $5,415,334 was reported.

David A. Wright, 566 Washington Boulevard, Chicago, has purchased the right to manufacture the triple geared engine lathes formerly built by George B. Fifeld, Dexter, Me. The lathes are built in a standard pattern for ordinary shop work in seven sizes with swings of from 34 to 96 in. and in four sizes which range from 36 to 60 in. for heavy duty manufacturing. Cone pulley, geared head single pulley or motor drive can be furnished for all sizes of each type.

Fuel supplies in Michigan have reached such a low ebb that State Fuel Administrator W. K. Prudden has asked manufacturers to suspend operations from midnight Dec. 25 until midnight Dec. 29. Exceptions are factories making munitions for prompt shipment.

Large Powers Conferred on the President

Recent Taking Over of Plants by the Government Arouses Much Interest in Provisions of the Various Laws—Labor More Kindly Treated than Capital

WASHINGTON, Dec. 24.—Plans now being developed by several bureaus of the Government, including the Federal Trade Commission and the Food and Fuel Administrations, looking to an extension of price-fixing, are causing much concern to manufacturers and merchants throughout the country and many inquiries are being received here concerning the authority of executive officials to commandeer products needed for war purposes. Reports are steadily becoming more frequent of the taking over by the Government of large manufacturing establishments or their full output and there is naturally much interest as to how far the Government can go under existing legislation in the extension of its commandeering operations.

The general scope of the Lever food, feed and fuel law appears to be fairly well understood. This statute, though far less comprehensive than the Senate bill covering the same ground, which was afterward abandoned in favor of the House measure, unquestionably clothes the Fuel Administration with unlimited power to regulate the price of fuel and its distribution for Government needs, for private industry and for domestic purposes. The only omission made in the draft of the fuel section of the Lever bill was that of authority to fix wages and to require miners to stick to their tasks. The inability of the Fuel Administration to regulate these matters, however, has operated to nullify its authority with respect to the fixing of prices. Mine operators in both the bituminous and anthracite fields have found themselves, since the first schedule of coal prices was promulgated, in a position where threatened strikes forced them to raise wages to a point that eliminated all profit, and upon appeal to the Fuel Administrator at Washington they have secured price advances that have absorbed the wage increases demanded by the operatives. It has thus been made perfectly clear that, in default of any power to require the miners to work at a scale fixed by the Government, the question of maximum production, which is the vital one, is beyond the control of the Fuel Administration, and the miners at any time may force an increase in the price of coal by demanding more wages under threat of a strike.

Seek Favor of Labor

The desire of the average public man, especially if he is a member of the Senate or House, to "stand well with labor" is clearly reflected in the marked difference in the treatment of labor and capital in the commandeering legislation enacted during the past 18 months. In no case has the Government sought to require labor to keep to its job, and several measures, proposing that where commandeered manufacturing plants were taken over by the Government all the employees thereof should be drafted into the Federal service and required to work, have been unceremoniously rejected by the committees having jurisdiction of the subject. The House Naval Committee, especially, has been particularly sensitive on this point, and at the last session refused to consider a carefully drawn measure supported by some of the most farsighted men in Congress which would have clothed the Secretary of the Navy with power to keep together the organizations of any manufacturing establishments commandeered for naval construction purposes.

The treatment of manufacturers in the commandeering legislation has been in marked contrast with that of labor. In addition to the Lever bill, three drastic laws worked out with comprehensive detail have been enacted, providing not only for the commandeering of manufacturing plants, but imposing upon the individual owners thereof, or upon the responsible officials of the owning corporations, the duty of meeting the requirements of the Government under heavy penalties of fine and imprisonment. The fact that the constitutionality of these statutes has never been tested is probably the finest tribute that could be paid to the patriotism of the manufacturers of the country who in no instance thus far have refused to co-operate heartily with the Government in the effort to obtain material at the earliest possible moment. The attitude of the manufacturers is in marked contrast with that of the labor leaders who, as the obvious result of a general understanding, are meeting all talk of labor conscription with thinly veiled threats.

First Commandeering Law

The first commandeering statute enacted by the Government in contemplation of the existing war was contained in the so-called National Defense Act approved by the President June 3, 1916. Section 120 of this act provides as follows:

> The President, in time of war or when war is imminent, is empowered, through the head of any department of the Government, in addition to the present authorized methods of purchase or procurement, to place an order with any individual, firm, association, company, corporation, or organized manufacturing industry for such product or material as may be required, and which is of the nature and kind usually produced or capable of being produced by such individual, firm, company, association, corporation, or organized manufacturing industry.
>
> Compliance with all such orders for products or material shall be obligatory on any individual, firm, association, company, corporation, or organized manufacturing industry or the responsible head or heads thereof and shall take precedence over all other orders and contracts theretofore placed with such individual, firm, company, association, corporation, or organized manufacturing industry, and any individual, firm, association, company, corporation, or organized manufacturing industry or the responsible head or heads thereof owning or operating any plant equipped for the manufacture of arms or ammunition, or parts of ammunition, or any necessary supplies or equipment for the Army, and any individual, firm, association, company, corporation, or organized manufacturing industry or the responsible head or heads thereof owning or operating any manufacturing plant which, in the opinion of the Secretary of War shall be capable of being readily transformed into a plant for the manufacture of arms or ammunitions, or parts thereof, or other necessary supplies or equipment, who shall refuse to give to the United States such preference in the matter of the execution of orders, or who shall refuse to manufacture the kind, quantity, or quality, of arms or ammunition, or the parts thereof, or any necessary supplies or equipment, as ordered by the Secretary of War, or who shall refuse to furnish such arms, ammunitions, or parts of ammunition, or other supplies or equipment, at a reasonable price as determined by the Secretary of War, then, and in either such case, the President, through the head of any department of the Government, in addition to the present authorized methods of purchase or procurement herein provided for, is hereby authorized to take immediate possession of any such plant or plants, and through the Ordnance Department of the United States Army, to manufacture therein in time of war, or when war shall be imminent, such product or material as may be required, and any individual, firm, company, association, or corporation, or organized manufacturing industry, or the responsible head or heads thereof, failing to comply with the provisions of this section shall be deemed guilty of a felony, and upon conviction shall be punished by imprisonment for not more than three years and by a fine not exceeding $50,000.
>
> The compensation to be paid to any individual, firm, company, association, corporation, or organized manufacturing industry for its products or material, or as rental for use of any manufacturing plant while used by the United States, shall be fair and just.
>
> The President is hereby authorized, in his discretion, to appoint a Board of Mobilization of Industries Essential for Military Preparedness, nonpartisan in character, and to take all necessary steps to provide for such clerical assistance as

he may deem necessary to organize and co-ordinate the work hereinbefore described.

Conscription of Executives

Although the terms of this act have not been tested, law officers of the Government express the opinion that the term "failing to comply with the provisions of this section" would cover the refusal of any person holding an important executive or managerial post in any of the plants referred to, whether he was financially interested in the establishment or not. If this view of the law is sound, it amounts to the conscription of executives, managers, superintendents, etc., under penalties that would deprive recalcitrants of comfortable fortunes. The indignation that the enactment of a similar statute with regard to labor would arouse among its present leaders may well be left to the imagination.

The second commandeering statute enacted by Congress is found in the provision of the Naval Appropriation Act of May 4, 1917, which carried a naval emergency fund of $115,000,000. It was carefully stipulated that the word "person," as used in the commandeering section, should include "any individual, trustee, firm, association, company or corporation," and the provision was drawn with great care to avoid the suggestion, as the result of ambiguity or otherwise, that it should apply to labor; in fact, it was in connection with this statute that the House Naval Committee refused to incorporate a labor conscription provision. The commandeering section of this act provides as follows:

That in time of war, or of national emergency arising prior to March 1, 1918, to be determined by the President by proclamation, the President is hereby authorized and empowered, in addition to all other existing provisions of law:

First. Within the limits of the amounts appropriated therefor, to place an order with any person for such ships or war material as the necessities of the Government, to be determined by the President, may require and which are of the nature, kind, and quantity usually produced or capable of being produced by such person. Compliance with all such orders shall be obligatory on any person to whom such order is given, and such order shall take precedence over all other orders and contracts theretofore placed with such person. If any person owning, leasing, or operating any factory equipped for the building or production of ships or war materials for the Navy shall refuse or fail to give to the United States such preference in the execution of such an order, or shall refuse to build, supply, furnish or manufacture the kind, quantity, or quality of ships or war materials so ordered at such reasonable price as shall be determined by the President, the President may take immediate possession of any factory of such person, or of any part thereof without taking possession of the entire factory, and may use the same at such times and in such manner as he may consider necessary or expedient.

Second. Within the limit of the amounts appropriated therefor, to modify or cancel any existing contract for the building, production, or purchase of ships or war material; and if any contractor shall refuse or fail to comply with the contract as so modified, the President may take immediate possession of any factory of such contractor, or any part thereof without taking possession of the entire factory, and may use the same at such times and in such manner as he may consider necessary or expedient.

Third. To require the owner or occupier of any factory in which ships or war material are built or produced to place at the disposal of the United States the whole or any part of the output of such factory, and, within the limit of the amounts appropriated therefor, to deliver such output or parts thereof in such quantities and at such times as may be specified in the order at such reasonable price as shall be determined by the President.

Fourth. To requisition and take over for use or operation by the Government any factory, or any part thereof without taking possession of the entire factory, whether the United States has or has not any contract or agreement with the owner or occupier of such factory.

That all authority granted to the President in this paragraph, to be exercised in time of national emergency, shall cease on March 1, 1918.

Method of Compensating

For the first time in connection with the Naval Appropriation Act above quoted it was provided that whenever the United States should commandeer a factory or any ships or war material it should make compensation "as determined by the President," and that if the amount so determined should prove unsatisfactory to the person entitled to receive the same, such person should be paid 50 per cent of the amount tendered and should be entitled to sue in the United States Court of Claims for any remaining compensation alleged to be due. The unfairness of relegating a manufacturer to the tedious routine of the Court of Claims for more than 50 per cent of the amount of his damage was frankly acknowledged by Congress in subsequent legislation in which the amount of the initial payment was raised from 50 to 75 per cent.

The Latest Provision

The latest provision authorizing the Government to requisition plants or material is found in the so-called Urgent Deficiency act of June 15, 1917, which carried a huge appropriation for the United States Shipping Board. This provision vested in the board power not only to take over private shipyards but all vessels building therein and to assume all contracts covering such construction. This law, while more comprehensive than the other statutes quoted, is less drastic in the treatment of the parties in interest, and under its provision the Government has taken over nearly 3,000,000 tons of vessels building in American shipyards. Certain ships constructed for foreign account have been released as the result of negotiations through the State Department, and others have been delivered to the parties ordering them upon condition that they would be operated in accordance with the wishes of the shipping board. So far as is known, no owner has thus far been obliged to appeal to the courts for adequate compensation, although it is understood that a number of contracts are still the subject of negotiation.

Generally speaking, the war powers of the President as exemplified in the commandeering statutes here described are practically limitless. That they will be still further defined by additional price-fixing legislation is regarded as highly probable, and already, in addition to the Pomerene steel control bill now pending in the Senate, there is under advisement in several bureaus of the Government a project covering a long list of manufactured goods much more comprehensive than the ordinary category of "necessaries of life."

W. L. C.

Quoting for Business in the Far East

The attention of THE IRON AGE has been called to the importance of American export houses quoting to firms in the Orient c.i.f. The Eastern Trading Co., Tientsin, China, writes:

"On many occasions, we have had to refuse business because America would only quote ex works or f.a.s. We understand the position of export houses in America and although their books overflow with orders we think it is a shortsighted policy not to make the most of their opportunity.

"When domestic requirements are filled, surplus products must find a market abroad in the future and we know that Chinese dealers will give their business to suppliers from whom they bought in pre-war days. American houses write about the difficulties of quoting c.i.f., but the difficulty is easily overcome. English houses send us price lists with c.i.f. quotations based on the current rates of freight, etc., and when we cable for a firm price, they recast the figures and quote. War risk is included in the quotation at a flat of five guineas per cent increase or decrease for our account. The chief reason why merchants in the Far East insist on c.i.f. quotations is the difficulty of exchange and unless we knew the c.i.f. cost, business would be almost impossible. Rate of exchange fluctuates with the price of silver and you are probably aware of the ups and downs during the past year or so. We might mention that those firms which sent a representative to China during the last year or so now always quote c.i.f. American suppliers usually require sight or 30-day sight drafts while English houses are willing to draw on us at four months' sight."

Judge Gary Announces Additional Prices

Cast-Iron Pipe, Steel Castings and Other Products Included — Recommendations as to Various Grades of Old Material

JUDGE E. H. GARY, as chairman of the Committee on Steel and Steel Products of the American Iron and Steel Institute, has issued a statement naming prices on angle bars, tie plates, track spikes, track bolts, cast-iron water pipe, steel castings, rail steel bars, cut nails, forging ingots, splice joints for light rails, cast-steel slugs for projectiles, extra for forging bars, and recommendations on scrap, also differentials on pig iron, with phosphorus over 0.04. The statement follows:

"Referring to the statements of the chairman of the Committee on Steel and Steel Products of the American Iron & Steel Institute dated Nov. 13 and Nov. 20, 1917, recommending prices for certain steel products to be adopted as maximum prices, to take effect immediately, to apply to the requirements of the United States Government, to the war requirements of the Allies and for domestic consumption within the United States, the committee now makes similar recommendation to the iron and steel industry in respect of the prices below stated.

"The committee also recommends to the industry that the additional extras and differentials below stated be adopted, to take effect immediately.

"The committee expresses the hope that there will be no hesitancy in accepting the recommendations."

Rolled Steel Angle Splice Bars for Standard Sections

Steel "Tee" Rails, 50 lb. per yd. and heavier.

Base—25 gross tons or more, standard sections, which do not involve new roll equipment, per 100 lb., f.o.b. makers' mill $3.25

Less than 25 gross tons, subject to special arrangement.

Extras for quality, per 100 lb.

		Extras per 100 lb. for workmanship in addition to extras for quality		
		Hot Anealing	Hot Working	Oil Quenching
Low carbon, open hearth or Bessemer	Base	$.10	$.10	$.20
Medium carbon, open hearth or Bessemer	$.05	.10	.10	.20
High carbon, open hearth or Bessemer	.10	.10	.10	.20
Extra high carbon, open hearth	.15	.10	.10	.20

Extras for Special Analysis

	Per 100 Lb.
For sulphur specified in Bessemer steel .075 or higher	$.05
For sulphur specified in open hearth .06 maximum	.05
For sulphur specified in open hearth .05 maximum	.10
For phosphorus specified in open hearth .03 maximum	.045

These prices do not apply to patented angle splice bars and joints, which will be subject to special negotiation.

Rolled Tie Plates

Base—All sizes and weights, iron or steel, or single shoulder type, for use with standard tee rail sections, per 100 lb., f.o.b. maker's mill, $3.25.

These prices do not apply to other types of rolled tie plates which will be subject to special negotiation.

Forging Bars

Finished bars ordered for forging purposes 25c. extra.

Full bar extras, as shown above, apply in addition to this extra.

Note.—To be added to standard classification of extras on steel bars at end of sub-division headed "Other Bar Mill Products."

Iron Spikes

Base—per 100 lb., f.o.b. cars, Pittsburgh $4.50

Base size and quantity, and quantity differential as given above for steel spikes.

Extras for size, as above, to apply.

Standard Railroad Track Spikes

Steel spikes—Base—9/16 in. x 4½ in. and heavier, 200 kegs (200 lb. each) or more, per 100 lb., f.o.b. cars, Pittsburgh $3.90

Less than 200 kegs—$1 per 100 lb. extra.

Extras as follows:

Size	Per 100 Lb.	Size	Per 100 Lb.
⅝ x 6½ in.	Base	7/16 x 4½ in.	$.25
6 in.	Base	4 in.	.25
5½ in.	Base	3½ in.	.25
9/16 x 6 in.	Base	⅜ x 4½ in.	.40
5½ in.	Base	4 in.	.40
5 in.	Base	3½ in.	.40
4½ in.	Base	3 in.	.40
½ x 5 in.	$.15	2½ in.	.65
4½ in.	.15	5/16 x 3½ in.	.95
4 in.	.15	3 in.	.95
3½ in.	.15	2½ in.	.95
3 in.	.15	2 in.	1.30
		Reverse Point	.25

Standard Railroad Track Bolts

Base—Standard button head, oval neck, 3½ in. and longer by ¾ in and larger, with United States standard square nuts and rolled threads, 200 kegs (200 lb. each) or more, per 100 lb., f.o.b. cars, Pittsburgh $4.90

Less than 200 kegs—$1 per 100 lb. extra.

Extras as follows:

Diameter	Length	Per 100 Lb. Square Nut	Per 100 Lb. Hexagon Nut
1¼ in to ¾ in.	3½ in.	Base	$.30
	3¼ in.	$.20	.40
	3 in.	.30	.50
	2¾ in.	.40	.60
⅝ in.	3½ in.	.30	.55
	3¼ in.	.35	.60
	3 in.	.40	.65
	2¾ in.	.50	.75
	2½ in.	.60	.85
	2¼ in.	.75	1.00
9/16 in. and ½ in.	3 in.	.85	1.30
	2¾ in.	1.00	1.45
	2½ in.	1.15	1.60
	2¼ in.	1.20	1.75
	2 in.	1.35	1.90
	1¾ in.	1.55	2.10
	1½ in.	1.65	2.25
7/16 in.	2½ in.	1.55	2.00
	2¼ in.	1.75	2.20
	2 in.	1.95	2.40
	1¾ in.	2.15	2.60
	1½ in.	2.35	2.80
⅜ in.	2¼ in.	2.40	2.95
	2 in.	2.65	3.20
	1¾ in.	2.90	3.45
	1½ in.	3.15	3.70

Bolts with cut threads ..... $.10 per 100 lb.
Bolts with square recessed nuts ..... .10 per 100 lb.
Bolts with "Ideal" square recessed nuts ..... .15 per 100 lb.

Rail Steel Bars

(Rolled from Old Steel Rails)

Base price, per 100 lb., f.o.b. maker's mill $3.00

Extras as follows:

For Size

Rounds, squares and flats, including deformed bars and twisted squares take regular steel bar extras.

1 in. x 1 in. x ⅛ in. and larger angles, channels, flats and cultivator beams ..... Base

U-bars, regular channels, harrow I bars, diamonds, triangulars, 1½ in. x 1½ in. x 3/16 in. and larger tees, ¾ in. x ¾ in. x ⅛ in. and heavier, 1 in. x ⅝ in. x ⅛ in. and heavier angles—per 100 lb. $0.10

1 in. x 1 in. x 3/16 in. to 1¼ in. x 1¼ in. x 3/16 in. tees, per 100 lb. ..... .20

For Cutting to Length

No extra charge for lengths 24 in. and over; under 24 in. subject to negotiation.

These prices do not apply to special sections which will be subject to special negotiation.

Forging Ingots

Basic or acid open-hearth steel

	Per Gross Ton
Base, up to and including 36-in. diameter, with carbon not over 0.25 cast in chilled molds, f.o.b. makers' works	$73.00

With following extras:

For size

Over 36-in. diameter to and including 50-in. diameter, add to base price	$4.00
Over 50-in. diameter to and including 60-in. diameter, add to base price	8.00

For carbon

Over 0.25 to and including 0.60 carbon, add to base price	$1.00
Over 0.60 carbon, add to base price	2.00
For sand-cast ingots, add	10.00

Dimensions of hexagonal or octagonal ingots to be measured over flats.

These prices do not apply to ingots in which nickel or other alloys are specified, which will be subject to special negotiation.

Splice Joints Complete for Light Rails

Section	Price Per Complete Joint	Section	Price Per Complete Joint
8 lb.	$.16	30 lb.	$.45
10 lb.	.20	35 lb.	.52
12 lb.	.25	30 lb. angle bars	.60
14 lb.	.25	35 lb. angle bars	.66
16 lb.	.30	40 lb. angle bars	.85
20 lb.	.31	45 lb. angle bars	1.00
25 lb.	.38		

Cast Iron Water Pipe

Base—Standard cast iron bell and spigot pipe, 6 in. and larger, class "B" or heavier. Per net ton of 2000 lb. without penalty:

$49.00 f.o.b. Birmingham, Ala.
$55.35 f.o.b. New York.
$54.35 f.o.b. Chicago.

Differentials as follows:

3 in.	$10.00 over base
4 in.	3.00 over base
Class A or gas pipe	1.00 additional

Recommendations in Regard to Prices of Scrap Iron and Steel

No. 1. No. 1 heavy melting scrap.

The maximum price of $30 per gross ton, f.o.b. consumer's works, shall apply to all grades of iron or steel scrap to be melted, which normally sold at or under the price of No. 1 heavy melting steel scrap, including malleable cast scrap of all kinds, and cast iron scrap of all kinds, including iron car wheels.

A special charge of not to exceed $3 per gross ton may be paid for cutting heavy melting scrap to sizes 18 in. and under in length.

Parties operating acid open-hearth furnaces, or crucibles, converters or electric furnaces making tool steel or steel castings, may pay a maximum of $10 per gross ton over the base price of heavy melting scrap, for scrap guaranteed not to exceed 0.04 in phosphorus and 0.04 in sulphur. Such parties may also pay a differential of not to exceed $5 over the base price of heavy melting scrap for low phosphorus material not guaranteed as to analysis.

No. 2. Steel rails 56 lb. per yd. and heavier, 5 ft. and over in length, suitable for rerolling purposes, may be purchased at a differential of not more than $5 over the base price of heavy melting steel scrap, provided the purchaser currently operates mills for rerolling such rails.

No. 3. Parties operating mills rerolling old locomotive tires, axles, arch bars, transoms, shafting or similar rerolling material, shall not pay more than $47.50 per gross ton (the base price of 4 x 4-in. rerolling billets) for such material delivered at their works.

No. 4. No. 1 railroad wrought scrap.

The maximum price of $35 per gross ton, f.o.b. consumer's works, applies to all scrap used by iron rolling mills which normally sold at or under the price of No. 1 railroad wrought scrap, and includes yard scrap, track scrap, short wrought, busheling, wrought iron or soft steel pipe or similar material normally used by bar iron manufacturers.

The term "busheling" scrap used in this ruling means scrap suitable for busheling furnaces.

No. 5. Cast iron borings and machine shop turnings.

The maximum price of $20 per gross ton, f.o.b. consumer's works, applies only to turnings and borings used for remanufacture into iron or steel products.

No. 6. Parties operating chemical plants, or plants for purposes other than the remanufacture into iron and steel products may pay a differential of not to exceed $5 above the base price.

Parties employing recognized scrap dealers or brokers to purchase scrap for them may pay such dealer or broker a commission for such service, not to exceed 3½ per cent of the actual delivered price of the materials so purchased.

Steel Casting Prices

Column Bases, Bridge Blocks and Shoes

$7 to $7.75 per 100 lb., depending on weight of castings and quantity required from one pattern.

Add $2 each for test bars in excess of two bars per heat.

Boiler Castings and Fittings

(Light Section) $13.65 to $41.50 per 100 lb., depending on weight of castings required.

(Heavy Section) $11.60 to $35.80 per 100 lb., depending on weight of castings required.

Flange Castings

$10.55 to $28.75 per 100 lb., depending on weight of castings and quantity required from one pattern.

Engine Castings

$8.40 to $35.55 per 100 lb., depending on weight of castings required and intricacy of design.

Add ½c. per lb. if over 0.40 carbon is specified.

Old Style Anchor Castings

$10.60 to $17.85 per 100 lb., depending on weight of castings required.

Add ½c. per lb. for chemical or physical test. Other tests to be paid for by customer.

Propeller Wheels

$11.10 to $35.90 per 100 lb., depending on weight of castings required.

Cement Mill Castings

$9.20 to $21.30 per 100 lb., depending on weight of castings required and intricacy of design.

Gears, Pinions, Segments, Racks, Worms, Worm Wheels, Sprockets, Sheaves and Pulleys

$8.05 to $30.20 per 100 lb., depending on weight of castings and quantity required from one pattern.

Add ½c. per lb. if carbon over 0.40 is specified.

Add ½c. per lb. if physical test is specified.

Add for alloys, the usual extras.

Crane Castings

$8.95 to $31.85 per 100 lb., depending on weight of castings required and intricacy of design.

Mine and Industrial Car Castings

$8.20 to $21.70 per 100 lb., depending on weight, intricacy of design and quantity required from one pattern.

Mine and Industrial Car Wheels

$7.70 to $11.35 per 100 lb., depending on weight, intricacy of design and quantity required from one pattern.

Freight Car Castings of Standard American Design

$7.95 to $22.75 per 100 lb., depending on weight, intricacy of design and quantity required from one pattern. Patterns to be furnished free of charge, *by the foundry*, when more than 500 castings are ordered from each pattern at one time.

Freight Car Castings of Foreign Design

$10.95 to $20.60 per 100 lb., depending on weight and intricacy of design. Patterns to be furnished free of charge, *by the foundry*, when more than 500 castings are ordered from each pattern at one time.

Miscellaneous Railroad and Locomotive Castings

Driving Wheel Centers: $7.70 per 100 lb.

Engine Frames: Under 2000 lb., each $11.20 per 100 lb.; over 2000 lb., each $8.20 per 100 lb.

Miscellaneous Railroad Castings

$8.70 to $19.70 per 100 lb., depending on weight of castings required and intricacy of design.

Rail or Step Joint Castings

$10.50 per 100 lb.

Refractory and Brick Yard Castings

$10.75 to $29.85 per 100 lb., depending on weight of castings required and intricacy of design.

Jaw and Gyratory Crusher Castings

$7.55 to $31.45 per 100 lb., depending on weight of castings required and intricacy of design.

For jaw crusher frames made in one piece and gyratory crushing housings, add 20 per cent to these prices.

Road and Mining Machinery Castings

$8.15 to $34.50 per 100 lb., depending on weight of castings required and intricacy of design.

Extras for Alloy Steel

Nickel Steel: When 2½ per cent to 3½ per cent nickel is specified, add 3.50c. per lb.

Vanadium Steel: When approximately 0.18 per cent vanadium is specified, add 2.50c. per lb.

Chrome Steel: When approximately 1 per cent chromium is specified, add 1.50c. per lb.

Chrome Nickel Steel: When approximately 1 per cent chromium and 2 per cent nickel is specified, add 4c. per lb.

Chrome Vanadium Steel: When approximately 1 per cent

(*Continued on page* 1564)

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EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

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Car and Locomotive Building

A significant fact illustrating the unusual alignment of affairs in the iron and steel trade in 1917 is the very small volume of buying of rolling stock by the railroads in a year in which iron and steel was pushed to the limit. Domestic roads ordered only about 50,000 freight cars during the year, and nearly all of these were purchased in the first half. At the beginning of the year, however, there were orders for about 50,000 cars for domestic roads, so that if all orders had been completed within the year there would have been about 100,000 furnished. This was less than half the number furnished in the three best years of freight car building and represents less than normal replacement requirements, for there are about 2,500,000 freight cars in service, and they do not have an average life of anything like 25 years. The old wooden cars have been depreciating rapidly, while it has been developed in the past few years that the early dreams of great longevity for all-steel cars have not been borne out in actual experience, there being no hope that the average steel freight car will last a quarter century. The railroads accordingly have been losing in effective car equipment during the past year, although the traffic demands upon them have greatly increased.

While the car shops received orders for only about 50,000 freight cars from domestic roads this year, they received orders for a larger number from other sources. Excluding Russian orders tentatively placed in October, but since held in abeyance, the export orders of the year amounted to about 40,000 cars. In addition to this the United States Government ordered about 25,000 cars for its railroad operations in France, making a total of about 115,000 freight cars booked by shops in the United States during the year. Even this total was much below the average, counting the good years with the bad.

Locomotive orders placed during the year made a somewhat more substantial showing, as they totaled nearly 6000. The count, however, is more impressive than the tractive effort or weight involved, as about 1000 are narrow-gage gasoline engines for the Government's operations in France. Maximum locomotive output in recent years has been about 5000, but there is capacity for building a larger number, and with large orders for a single type, as in the case with the Government orders, the output could be swelled well above 6000. Locomotives ordered by domestic roads in 1917 totaled a trifle over 2000. Export orders, excluding Russian orders, now held up, made a total of 1700.

The American railroad in France is to be a double track road of about 400 miles, with numerous spurs, and, according to the orders thus far placed, this road will have in service nearly 25,000 freight cars, together with 980 standard locomotives, the remaining equipment being for use on narrow gage track behind the trenches.

The important fact at present with regard to locomotive building is that with standardized methods of construction, locomotives can be turned out more rapidly than ever before, and with the powers possessed by the Government a large number can be built for domestic roads in a very few months merely by arranging the necessary financing. With respect to freight cars, the situation is not so clear. It is not certain the railroads would need very many more cars if they were properly supplied with motive power. A canvass a few weeks ago indicated that there would be some steel plates available for car building after the full requirements of the shipbuilding program were taken care of. The suggested plan of building merchant ships by the conveyor system, such as is followed in the assembling of automobiles, might consume a larger tonnage of plates than was contemplated, but the plan was made public only this week.

Judge Prouty's Words of Caution

Charles A. Prouty, who for several years has been director of the Bureau of Valuation of the Interstate Commerce Commission, after having served a number of years as a member of that commission, did some very plain and sensible talking a few nights ago at a meeting of the Railway Men's Improvement Society in New York. Although a man of progressive ideas, Judge Prouty, who is an able lawyer, established a reputation for fairness during the long period of service as a member of the commission. He is a believer in reasonable regula-

tion of railroads. In the speech referred to, he attributed the present lamentably poor service of the railroads to a large extent to the indifference of railroad employees. The inefficiency which always prevails when there are more jobs than men, as has been noted in many industries to a very unusual extent during the past two years, has extended to transportation, and it is perfectly plain that if the railroads are to do their full part in winning the war the men must be impressed by the importance of their doing their utmost in their daily tasks. There is, as Judge Prouty said, too much of the spirit of every one "wanting to put on a uniform, get a gun and shoot some one." The fact is that there is just as strong a demand for ununiformed patriots as for those who are now or expect to be engaged in the more spectacular work of the war.

In analyzing the causes of the present railroad demoralization, Judge Prouty urged the importance of more co-ordination and described the conflicting efforts of the Food Administration, the Fuel Administration and the War Department, all insisting upon receiving the best service. He might have painted a picture of the ridiculous piling up of priority orders and preferential priority orders and other kinds of orders intended to help win the war, but in fact causing endless trouble. How all the difficulties are to be straightened out is, of course, the great problem. Judge Prouty expressed the opinion that it would be madness, if Government operation is decided upon, to attempt at this time any reorganization of the operating forces of the railroads, and he certainly is right on that point. It might, of course, be necessary to have a representative of the Government as the supreme authority in operating the railroads, but the masses of the railroad men should be merely transferred from the payroll of the carrier to that of the Government, if the Government assumes control. But Judge Prouty asserts—and in this opinion he will be generally supported — that the Government should not assume control unless it is absolutely necessary to do so. As to wages, he believes the question should be left for decision by the President. This has already been done by the railroad companies. The question is, will the employees be willing to leave their cause also with the President? Up to the present time they have not promised to do so.

At a time when radicals are urging extreme measures, it will be fortunate for the nation if men of the wisdom of Judge Prouty are listened to by those in high authority at Washington, especially by the President, who is expected to take some kind of definite action in regard to the railroads after the holidays.

Coal Famine May Be More Acute

In the effort to prevent a decrease in the production of coal, the Fuel Administration at Washington has induced the officials of the United Mine Workers of America to appeal to their members not to take more than two days off from work during the Christmas holidays. The custom heretofore has been to take eight days, including Christmas and New Year's day. Coal operators throughout the country have advised the Fuel Administrator that they will co-operate heartily in the effort to keep the mines running as steadily as possible. The appeal of the United Mine Workers' officials to the men, which has been telegraphed to the various locals throughout the mining districts, says in part:

> The United States is in the grip of a coal famine. Recent snows and excessive cold weather have depleted the coal bins throughout the country. Never before has a coal shortage been so acute. Industries are being forced to close for the lack of fuel; street and electric signs are being turned out to save coal. Motive power of the railroads has practically broken down. Insufficient car supply makes it necessary that every empty car be loaded as quickly as possible. Therefore, out of consideration for the public need we are calling on the United Mine Workers of America to take only two holidays, Christmas and New Year's. Our patriotic duty demands that this be done. It will be a service the people of the Nation will appreciate. We earnestly urge local presidents, secretaries, and mine committees everywhere to see that this holiday request is fulfilled.

Washington dispatches of the past few days point to a more acute shortage of fuel in January and February unless there is a revision of the priority system, a curtailment of production of non-essentials to a degree that has not been entertained thus far and a better co-ordination of their transportations on the part of Government executives. It is argued that the railroads are now in large measure subject to Government orders and that the Government in assuming administration should be in position to remedy conditions of which the public is seriously complaining. The coal situation which the Government must meet is thus summarized in one Washington dispatch:

> The transportation experts say that out of every hundred cars hauled by a railroad 35 should carry coal. Twelve of these must carry coal to be used by the railroads, the 23 remaining being needed for industries. If the 23 cars are not shipped the time is not far distant when many factories must close for want of coal, which would automatically cut shipments of raw material and finished products. It happens that the railroads following out the priorities order of the Government have been shipping at a rate very much below 35 coal cars to every hundred, but no matter how much coal was left on sidings the railroads have been forced to ship 12 cars of coal in every hundred for their own use. . . . To-day the railroads are being offered 50 per cent more freight than they can handle. In other words, the demand is 150 per cent of capacity. Of this 150 per cent almost 120 per cent is listed under Judge Lovett's priority order No. 5 as coming ahead of coal for factory or domestic consumption.

It is evident that consumption must be reduced in some directions if the country is to get through the winter without a serious handicap on industries whose production must be kept at high point. A factor which no amount of Government contriving can remedy is the poor quality of coal now being delivered for industrial uses, and this applies also to coke. More tons of such coal as is now being shipped are required to raise the same amount of steam and more tons than ever of coke must be charged into the blast furnace in order to get the same yield of pig iron. Probably the most difficult feature of the situation is the way in which priority orders negative the directions of the Fuel Adminis-

tration. No matter how many orders are given to the mines to send coal to certain sections, the coal will not go because the railroads cannot violate the priority orders of the Government. It would seem that further concentration of authority is an imperative step.

If the premises stated in the first article in this issue are correct, the rail mills of the country have three years' work ahead of them, even if no main lines or sidings be extended or new roads projected. The 10,000,000 tons put forward in the calculation as measuring the extent of lighter rail lines needing replacement is reckoned on the basis of 6 per cent of mileage being a fair if not low estimate of the average amount which needs to be renewed annually to maintain satisfactory condition of roadbed. The total apparent need of some 40,000,000 tons for this purpose over a period of 24 years and a supply against this of some 30,000,000 tons indicates that replacement has averaged only 4½ instead of 6 per cent. It is admitted that the additions from year to year of heavier rails meeting the more exacting specifications of the last decade tend to reduce the replacement factor; but when some of the Eastern roads find that renewals amount to 10 per cent, the analysis leaves it difficult to avoid the conclusion that railroad demand should be fully as great a factor as our contributor contends.

Shortage of Locomotives in Pacific Coast States

The demand for railroad equipment, especially for locomotives and parts, is becoming acute on the Pacific Coast. The San Francisco representative of a prominent locomotive builder states that locomotive deliveries to roads on the Pacific cannot be made under a year or eighteen months. The Southern Pacific Railway maintains works for building cars and locomotives in Sacramento and Los Angeles, but nearly all the castings must be brought from the East. This is because foundries on the coast do not possess the necessary facilities for making castings used in locomotive parts. These finished castings are as hard to obtain from eastern foundries as the finished locomotives are from the locomotive makers. Large orders have been placed, consequently, for rough castings of such parts, and they will be finished at local shops. Even on these rough castings deliveries are not guaranteed under four months.

It is stated that some of the eastern locomotive builders have locomotives partly built and cannot obtain the necessary steel to complete them except after long delays. The situation is explained by the statement that all the available locomotives have been shipped to Europe to help in the prosecution of the war. It is certain that many western locomotives have been withdrawn for use in the eastern part of the United States, and the railroads on the Pacific Coast are having a hard time to maintain their former service.

The manufacturers' conservation committee on power and fuel, representing the Chamber of Commerce and the Employers' Association of Pittsburgh, with A. L. Humphrey, chairman of the executive committee, has appointed a committee on surveys, comprising William G. Costin, H. C. Graham and S. S. Wales. This committee is already actively at work making a tour of the Pittsburgh district with a view of securing information as to the unused power facilities, the further development of those now in use, and what can be done to conserve the power developed.

New Scrap Prices Explained

A member of the American Iron and Steel Institute sub-committee on scrap makes the following explanation of the recommendations in regard to old material which have been adopted:

"No. 1 heavy melting steel may bring a price of $33 per gross ton at any consuming mill in the United States, but not over this price. There is a special dispensation given in case of specification steel scrap whereby $33.00 may be paid for material which must be prepared especially, and which must be selected—in other words, what is called special scrap, where, for instance, a charging box is particularly small, or where a mill does not want to use shoveling scrap, or where a mill uses shoveling scrap—the maximum price of $33.00 gross ton may be paid by a consuming mill delivered the mill.

"Regarding low phosphorus scrap, up to $40.00 gross ton may be paid, but not exceeding this price on material guaranteed not over 0.04 in phosphorus and sulphur. In case of springs, couplers and knuckles, and other scrap which is used by cast-steel manufacturers, or crucible manufacturers, where material is used for special purposes—on this particular high-grade material, and also including low-phosphorus scrap which is not guaranteed by the seller to be not under 0.04 in phosphorus and sulphur, the stipulated price is to be $35.00 gross ton maximum.

"The price on rerolling rails is $35.00 gross ton at any consuming mill in the United States, it being distinctly understood that only rerolling manufacturers may use these rails. The price of $47.50 gross ton delivered to any and all consuming mills may be paid for such material as locomotive tires, axles, arch bars, transoms, shafting and such rerolling mill material.

"On No. 1 railroad wrought the maximum price is $35.00 gross ton, and this shall not be exceeded by any consuming mill, delivered mill, on such commodities as short wrought scrap, track scrap, busheling, pipe and similar material. Cast-iron borings and wrought iron and soft steel machine-shop turnings, loaded separately, shall not exceed the price of $20.00 gross ton maximum delivered any consuming mill. Borings or turnings which are used by chemical works exclusively, and not by mills which would manufacture this commodity into any iron or steel product, may be allowed to pay an excess of $5.00 gross ton above the price of $20.00 gross ton fixed as a maximum for rerolling mill consumption.

"It is strictly understood and agreed that on each and every item where material prior to the state of war, and during normal conditions, has sold under the price of No. 1 heavy melting steel, or under low-phosphorus scrap, or rerolling rails, or wrought scrap, or whatever it may be, the maximum price as specified shall not be exceeded under any condition. In other words, this is making various groups. It is also agreed and understood that the commission of 3½ per cent may be paid at the mill of consumption to such scrap dealers, or brokers, who may be delegated by a particular mill to buy specific lots of scrap for it, but it is not an obligation, as it is the will of the consuming mill to pay this, if it desires to do so.

"Do not forget that the price of car wheels, the price of any kind of cast iron, and price of any kind of malleable scrap, may be up to the $30.00 gross ton, the maximum price of steel, but not over it."

The Brooks Works of the American Locomotive Co., Dunkirk, N. Y., have recently received an order for 250 locomotives and will commence construction work on the new engines early in January. The order is said to aggregate about $7,000,000. The local plant is now completing an order of 85 locomotives for Russian railways.

The Carpenter Steel Co., Reading, Pa., has arranged for the painting of a service flag on the side of one of its buildings, containing 165 stars, the number of employees of the company now in the Government service.

STEEL PRICES UNCHANGED

War Industries Board's Recommendation to the President

WASHINGTON, Dec. 24.—The War Industries Board, after a protracted conference with members of the Federal Trade Commission, has recommended to the President the indefinite extension after Jan. 1 of the schedule of controlled prices for iron and steel promulgated last September. The cost findings of the commission, covering the operations of the iron and steel industry up to Oct. 31, were transmitted to the board Dec. 21, and on the following day were explained in detail to the members of the board by Trade Commissioner Davies. The findings showed important advances in costs, which mounted steadily throughout the summer, but Commissioner Davies based no recommendation upon the cost exhibits, taking the position that the function of the trade commission is merely to ascertain facts and to leave it for the War Industries Board to adopt its own policies in its recommendations to the President.

In deciding to recommend the continuance of the September schedule and the prices in accord with it announced in later weeks, the War Industries Board was largely moved by suggestions made by the steel manufacturers at their conference with the board and with the trade commissioners held here a fortnight ago. At that time the steel men took the position that, irrespective of the desirability of making certain minor changes in the schedule of controlled prices, it was important in the interest of the entire industry to maintain the existing schedule, which has operated as a stabilizer in all manufacturing districts, and to give assurance to that effect as soon as possible. It is expected that the President will issue a proclamation in the course of a few days formally extending the operation of the September schedule. Whether the extension will be made indefinite is not known, but it is believed that within the next 90 days certain readjustments will be made.

W. L. C.

Government Takes Over Ship Plants

Following the merger of the Pennsylvania Shipbuilding Co. and the New Jersey Shipbuilding Co., both of Gloucester City, N. J., and the Pusey & Jones Shipbuilding Co., Wilmington, Del., the Government has assumed control of the Gloucester City works, effective Dec. 17. Employees have been given the opportunity of signing for a six months' period, with increase wage of 50 cents per day and draft exempt. The bonus system which has been operative will be abolished, and employees placed upon a similar basis as those employed at the Government navy yards. It is said that the Government has taken over the plants on the basis of time plus material plus 10 per cent profit. The plant of the New Jersey Shipbuilding Co., now in course of construction, will be rushed to completion. The Pennsylvania Shipbuilding Co. works have been giving employment to upward of 3000 hands, and it is expected that this number will be rapidly increased.

The Pattern Makers' Association of the Pittsburgh district has demanded, effective Jan. 1, 80 cents per hr. in manufacturing shops and 90 cents per hr. in jobbing shops. The executive committee of the Employers' Association of Pittsburgh has unanimously decided that these increases are unwarranted, and that the present rate of wage be maintained, and no answer be made to the demand. The jobbing shops in the Pittsburgh district have unanimously concurred in this action. The concerns named below have recently joined the Employers' Association of Pittsburgh as follows: Sigwart & Rolston Machinery Works, Chas. E. Dixon & Son, and Iron City Products Co., all of Pittsburgh.

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The Accident Hazards of Sheet Mills

In discussing a paper on "Safe Practices in Sheet Mills" presented at the recent congress of the National Safety Council, J. M. Woltz, safety director Youngstown Sheet & Tube Co., Youngstown, Ohio, stated that as a result of their experience fingers were the part of the body most likely to meet with an accident. These injuries were divided into cuts, bruises, burns and crushes and were followed by the forearm with cuts, burns and bruises. Cramps, he stated, although they could hardly be classed as accidents, were one of the most serious hazards of sheet mill operation. A solution of this last problem was educating the employee to see the need of right care of the body, the use of proper food and drink. In an accompanying table the number of accidents occurring from Jan. 1, 1915, to June 30, 1917, are tabulated, according to the parts of the body, together with the number of days lost. The marked reduction in the number of cramp cases in 1916 over 1915 was due in part to the reduced operating force, but was also brought about by the installation of a set of grates in the standing on the catcher side of each pair of rolls that permitted a stream of cool air under low pressure, to flow upward continuously. Medical examination before employment also was a contributing factor in the reduction, since it prevented the employment of men unable to stand the work. Other hazards that had to be corrected were piling sheet bars and finished sheets too high and accidents in the handling and transportation of sheets and sheet bars. These last have been solved by the introduction of improved cradles or hooks for crane operations and tractors for trucks.

	No. of Accidents		6 M'ths of	No. of Days Lost		6 M'ths of
Part	1915	1916	1917	1915	1916	1917
Eye	983	524	225	95	159	63
Fingers	577	429	220	301	529	350
Forearm	231	150	54	228	169	103
Hand	116	102	43	78	183	22
Thumb	115	95	32	114	82	0
Wrist	113	71	35	90	142	16
Foot	59	51	34	99	229	265
Toe	54	44	17	222	255	16
Cramps	305	89	24	65	166	22
Back	18	24	12	319	208	33
Thigh	22	32	25	165	124	35

Witnesses Agree on Important Points

Senate Committee Finds General Approval of Remodeling the Lee-Enfield Rifle—Rapid Progress Being Made at Various Plants—Causes for Delays Discussed

WASHINGTON, Dec. 24.—Highly interesting details of the great problem of the Ordnance Bureau, viewed from the manufacturing standpoint, have been developed in the course of the investigation by the Senate Military Committee which, so far as this branch of the War Department is concerned, was completed during the past week. The testimony of five high officials of the leading ordnance manufacturing concerns, each of them an expert, is unanimous upon the point that the Ordnance Bureau acted wisely in causing the Lee-Enfield rifle to be remodeled to fit the Springfield ammunition; that this ammunition is far superior to the British, having a velocity 50 per cent greater and a proportionately flatter trajectory; and that the Browning machine gun finally adopted as the leading type for the arming of the American forces is the best weapon of its kind ever invented. The Ordnance Bureau was sharply criticised by one of the manufacturers because, before it had an available appropriation, it gave no encouragement to his company to begin the manufacture of a machine gun since found undesirable for trench work, and a sixth witness repeated to the committee charges published sometime ago by a technical journal that, pending the standardization of the Enfield rifles ordered for the United States, certain employees of one of the plants were practically idle although still under pay. The witnesses examined included Henry S. Kimball, president of the Remington Metallic Arms Co.; Lewis Stoddard, vice-president of the Marlin-Rockwell Corporation; J. E. Otterson, vice-president and general manager of the Winchester Repeating Arms Co.; B. M. W. Hanson, vice-president of the Colt Arms Co., and Fred. H. Colvin, editor of the *American Machinist*.

The State of Preparedness

The net results of the inquiry into the operations of the Ordnance Bureau have shown a state of preparedness far greater than was believed at the outset as to heavy artillery, machine guns, rifles and ammunition and the salient fact has been fully developed that the producers of all this material are now building up to maximum capacity at a very rapid rate. The witnesses were substantially agreed that the manufacture of ordnance material of all kinds is a process slow in the inception and that to have provided adequate supplies for the arming of a large force during the first few months following the entrance of the United States into the war would have involved the placing of orders for the preliminary work, if not for actual production, long before Congress authorized the making of contracts. There was substantial agreement among the witnesses concerning the delays resulting from the re-chambering of the Enfield rifle to fit the United States ammunition and because of the decision of the Ordnance Bureau to secure a higher percentage of interchangeability in the parts of the rifle, but Mr. Otterson, who gave the committee the clearest statement of this transaction which it has yet been able to secure, frankly admitted that while, from a manufacturing standpoint, he did not consider the increased interchangeability secured worth the time lost, nevertheless, the decision of the matter "should rest on the judgment of a military man and not on the judgment of a manufacturer."

Remington Rifle Contract

President Kimball of the Remington Metallic Arms Co. told the committee about the contract for rifles which his company had entered into with the Ordnance Bureau. The number of rifles assigned to his company was stated by the witness, but at the direction of Chairman Chamberlain was stricken from the record as confidential military information. Before taking on the American contract the Remington company had made 400,000 rifles for the English Government and had a capacity of 3000 per day. Inasmuch, however, as the approved model of the Lee-Enfield rifle adopted by the Ordnance Bureau differed from the English rifle in caliber and in certain other respects it became necessary after completing the company's British contract to change its gages, dies and machinery in order to make the American rifle. It was also necessary, Mr. Kimball said, to modify the gages and certain other devices to standardize the output of the Remington company with that of the two other concerns also making Lee-Enfield rifles for the Ordnance Bureau.

The English contract for rifles was not completed until July 21 and although the Ordnance Department began negotiations for the modified Lee-Enfield rifle in April, soon after war was declared, it was not possible to begin the work of changing the equipment until July and deliveries could not be begun until October. The Remington company, Mr. Kimball said, hesitated to enter into a contract in advance of an appropriation by Congress which was not made until June 15, about two months after the Ordnance Bureau began negotiations.

"I do not wish," said Mr. Kimball, "to give the impression that there was delay in making the contracts themselves, as it was a very active operation from April up until July to determine the character of the rifle. It was due to necessary deliberation between the manufacturers themselves and the Ordnance Department that these matters of design were not settled earlier and I do not think they could have been settled much earlier than was actually done."

Replying to Senator Hitchcock Mr. Kimball said that if the Ordnance Bureau had decided to go on manufacturing the Lee-Enfield rifle for the United States on the same plans and specifications that had been used for the British Government deliveries naturally would have been begun earlier and would have been practically continuous from the time of the completion of the British contract. The results, however, would not have been as satisfactory for the reason that the British rifle uses an ammunition different from that of the American Lee-Enfield and the Springfield which has a much higher velocity and a lower trajectory.

At this juncture, Vice-President Tyler of the Remington company explained to the committee the difference between the English and American Enfield rifles.

Given Greater Range

Answering a question by Senator Hitchcock, Mr. Tyler said that the American ammunition gave the modified Lee-Enfield rifle a much greater range than the English rifle, the gain being from 500 to 800 yards. The increased velocity gave a lower trajectory and much greater shocking power.

"Is it conceded, then," asked Senator Wadsworth, "that the modified Enfield rifle that you are now making for the United States Government is a better rifle than you are making for the British Government?"

"I believe it is, without any question," replied Mr. Tyler.

"So that the only question left to be decided is whether the change was actually worth while in view of the emergency?"

"I think the change was decidedly advisable."

At this juncture, Senator Wadsworth submitted to Mr. Kimball a long carefully formulated question. He said:

"As preliminary to my question let me state, what I think must be conceded to be an axiom in the war,

namely, that the fewer complications with respect to interchangeability of supplies the better for the Army, and conceding that the French, British and American armies, so far as it is humanly possible, should be considered one army for the purpose of getting the maximum efficiency, and also conceding that, due to the fact that England and France had to go to war on a moment's notice with a good deal of their equipment already standardized and adopted, it was therefore impossible for them to make any essential changes in order to establish uniformity, would it have been possible for us, having in view this war for two and a half years with the handicaps of that very lack of uniformity well displayed and perfectly apparent—would it have been possible for us to have made plans and preparations reasonably in advance of the war, so that if we were called into it we would have gone into it with small arms using ammunition uniform either with the British or French and thus have avoided adding still further to the complications?"

"If your policy of preparedness had been started early enough it would have been possible," replied Mr. Kimball.

"Would it have been possible from Feb. 17, 1917?"

"No, sir."

"Would it have been possible from Aug. 29, 1916?"

"No, sir."

The committee took up the subject of machine guns.

Browning Gun Tests

"Are you familiar with the Browning gun as it behaved in tests?"

"We had our representative see that gun in tests," answered Mr. Kimball, "and he considered it the finest gun he had ever seen. He witnessed a complete test for accuracy and stability and functioning; also the sand test and all of the prescribed tests by the department. By the sand test I mean burying it in sand and then starting it into operation, making it free itself. It is a very severe test in the operation of a gun and we understand from our representative that the results were remarkable under those conditions.

"This is a brand new patent," suggested Senator McKellar, "and the gun has never been used in any warfare?"

"That is true," responded Mr. Kimball, "but Mr. Browning is probably the most remarkable gun-maker in the world. We are using his designs in sporting guns at this moment and we have never found Mr. Browning to fail in any gun he puts into our hands as a finished article."

"Is that the general opinion among all manufacturers?"

"I think that is the opinion of every gun manufacturer in the world."

The next witness heard by the committee was Lewis Stoddard, vice-president of the Marlin-Rockwell Corporation of New Haven, Conn. Mr. Stoddard said his company, in addition to its plant at New Haven, had recently acquired another plant known as the Hopkins & Allen plant at Norwich. At the present time the New Haven establishment had a contract for a large number of aircraft guns of a type designed in the plant but had previously delivered several thousand improved Colt machine guns of the lever type.

"During the first week in May, we presented for test two guns at Springfield and shortly after we received an order for 2500 guns. In the meantime we had been obliged to keep our factory going so we had simply taken a gamble on making the guns without any orders. We made 2650 guns for Russia which we had no order for and then when Russia looked like a pretty poor customer we started in making guns for the United States."

"What was the reason they were dissatisfied with your make?" asked Senator Hitchcock.

"I do not know; they bought 2500, but that was all they wanted. We ran over 400 guns that are left in the factory now. They do not want them. They are using our guns around the training camps."

Marlin Aircraft Gun

"Your testimony to-day is the first intimation," said Senator Wadsworth, "that the committee has received that another type of gun than the Vickers and Browning and Lewis has been ordered by the War Department in large quantities. I refer to the Marlin aircraft gun."

"Yes, we have a contract for a large number from the Army and a smaller number from the Navy. The Aircraft Board wanted to make the contract with us and I understood that all our negotiations were to be carried on with that board, but suddenly it was switched over to the Ordnance Department."

J. E. Otterson, vice-president and general manager of the Winchester Repeating Arms Co., told the committee about the contract which his company had received for 225,000 Lee-Enfield rifles rechambered to shoot Springfield ammunition. Since this contract was let, the company has received an order for an additional 100,000 and is also manufacturing light Browning machine guns and ammunition for both rifles and Colt automatic pistols.

Winchester's Work on Rifles

"On April 23 I issued orders to the shops of the Winchester company to proceed with the manufacture of 10,000 rifles," said Mr. Otterson, "but this was done on our own responsibility and without any contract or order or any statement that we would get an order. On May 9 the sample rifles of the respective manufacturers were submitted to the commanding officer of the Springfield arsenal for test and they functioned properly and were held to be satisfactory with one or two minor criticisms applying to each rifle. On May 11 the contract form and specification had been agreed to as between the parties concerned and the contracts were ready for execution. On May 16 on the basis of the existing understanding we issued instructions to the shops of the Winchester company to proceed to manufacture these rifles and to build up to maximum capacity as rapidly as possible. On May 24, we received written instructions from Gen. Crozier to the effect that the War Department intended placing an order with us for 225,000 rifles."

An Editor's Criticism

Fred H. Colvin, editor of the *American Machinist*, repeated to the committee the criticisms heretofore made in that publication directed against the officers of the Ordnance Bureau for imposing what he declared were too rigid rifle specifications, especially in the matter of interchangeability. The requirements for interchangeability of parts, he said, delayed production three months during the past summer and while this matter was under consideration one private factory retained on its payroll a considerable number of men employed on a cost-plus-profit contract who played checkers while waiting for work held up. Mr. Colvin also made a general criticism of Government arsenal methods, declaring that the Springfield arsenal has some machinery that is 50 years old.

Vice-president B. M. W. Hanson, of the Colt Arms Co., Hartford, Conn., said the United States arsenals compare very favorably with foreign government establishments and American private factories. The chief difficulty experienced by the executives of the United States arsenals was the big labor turnover. Skilled workmen were constantly leaving the arsenals, thereby reducing their efficiency.

Mr. Hanson expressed the opinion that the production of rifles for the American army had been greatly increased by the adoption of the modified Enfield, which is now much superior to the rifles of the Allies and at least equal to those of Germany. American ammunition, also he said, was superior to that of the Allies.

Taking up the subject of the manufacture of machine guns, Mr. Hanson said the American producers had had practically no encouragement from the United States Government, most of their orders coming from abroad. Answering questions by Senator Wadsworth, he said that if machine guns had been promptly ordered when the Government went into the war, General Pershing's machine gun units would not be required to use French arms and ammunition. W. L. C.

Iron and Steel Markets

STEEL PRICES UNCHANGED

War Industries Board So Recommends to the President

More New Prices from the Producers' Committee —Further Scramble for Pig Iron

In the closing days of 1917 the steel trade has the satisfaction of knowing that it will enter the new year free from the fear that present price schedules may be overturned. The War Industries Board, after a conference on Saturday with the Federal Trade Commission, has recommended to the President the indefinite extension after Jan. 1 of the prices promulgated late in September and those built upon them in the past three months.

It is expected that the President will issue a proclamation shortly, extending the operation of the present schedule. Whether a definite period will be named remains to be seen, but it is believed that some readjustments will come within the next ninety days.

Recent rumors of a sentiment in a part of the Federal Trade Commission in favor of some reduction in pig iron led to a meeting of merchant producers in New York Dec. 20, at which a committee was appointed to present the case of the smaller furnaces. It was urged that a reduction in price would cause some of them to close down and only aggravate the existing famine in pig iron.

The manufacturers' committee on steel and steel products made an important announcement of additional prices this week, putting forging ingots at $73 per ton, splice bars and tie plates at 3.25c. per pound, rail steel bars at 3c., steel spikes at 3.90c., iron spikes at 4.50c., track bolts at 4.90c. and cut nails at $4 per keg, and fixing schedules on steel castings and cast-iron pipe. Some of the above products had been gradually adjusting themselves to the new market basis, so that the formal announcement meant no abrupt change. On cast-iron pipe the official $49, Birmingham, and $55.35, New York, for 6-in. pipe are but fractionally below the recent market.

The committee's action on old material is an attempt to cope with one of the most difficult problems in the trade. In view of the development that with a fixed price railroads and other sellers would deal with consumers direct in order to get the maximum, the committee recommends a commission of not to exceed 3½ per cent to recognized scrap dealers or brokers. Various forms of scrap not regulated heretofore are added to the official list.

The precedent of a quiet holiday week in pig iron is broken, as the real effect of the fuel shortage is brought home to consumers. Steel production has been kept up this year by drawing on pig-iron stocks. Now that these are gone there is a scramble for iron that would by this time have sent prices skyward but for Government regulation. It is estimated that Central Western steel companies would now be buying fully 250,000 tons of basic iron to make up their shortages if it could be had.

In Chicago and the Middle West there is active inquiry for basic, foundry and malleable irons. Steel companies are seeking merchant iron as their own furnace outputs are cut down, and some foundry firms having Government contracts are facing the necessity of calling on the Government to provide them with pig iron. This would mean that iron already sold would be requisitioned, and that some foundries turning out less essential products would go without. The fuel shortage has already gone to the point of curtailing the output of a number of foundries. The situation simply represents the gradual tightening of the lines in the absorption of iron and steel for war needs.

In the past week the steel plants of the Steel Corporation at Pittsburgh and in the two Valleys made about an 85 per cent output. Independent companies ran at from 50 to 75 per cent of capacity. As an offset to the coke and coal shortage, some plants at Pittsburgh and Youngstown will be idle all of this week for repairs and stock taking. Chicago reports the fuel situation unrelieved and causing much anxiety.

Pittsburgh

PITTSBURGH, Dec. 24.

The mild weather of the past week or more has helped to relieve the railroad congestion to some extent, but the situation is still very far from being satisfactory. The coal supply is also slightly better, due to efforts of the committee on fuel and the operating committee of the eastern railroads to move coal more promptly, and some plants that were very short of coal in the first part of last week were able to run nearly full in the latter part of the week. One thing that is going to help the railroads and the coal situation is the fact that some steel plants in the Youngstown and Pittsburgh districts will probably be idle all this week for absolutely necessary repairs and for stock taking. A shut down of a considerable number of plants for a week would certainly do much to help the situation in cars and coal supply, as it would give the railroads a chance to move the thousands of loaded cars now lying in the different railroad yards. It is said that last week the steel plants of the Steel Corporation made about an 85 per cent output of steel ingots, but some of the independent plants, notably in the Youngstown district, were not able to operate to more than 50 to 75 per cent of capacity. There are still a considerable number of blast furnaces banked in the Pittsburgh and Youngstown districts for lack of coke, and the great scarcity in supply of open-hearth scrap is also commencing to affect operations of open-hearth steel plants, as some concerns are running short of scrap and find it impossible to get shipments in fast enough to meet their needs. The chances now are that the output of steel until after the first of the year will be very much under normal capacity. With the contemplated shut down, shortage in cars and coal, and also in pig iron, the output of the steel mills is certain to be restricted over the next ten days fully 25 per cent, and it may run 50 per cent. In the meantime, the amount

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 24, 1917.	Dec. 19, 1917.	Nov. 21, 1917.	Dec. 27, 1916.
No. 2 X, Philadelphia...	$34.25	$34.25	$34.25	$29.50
No. 2, Valley furnace...	33.00	33.00	33.00	31.00
No. 2 Southern, Cin'ti...	35.90	35.90	35.90	25.90
No. 2, Birmingham, Ala.	33.00	33.00	33.00	23.00
No. 2, furnace, Chicago*.	33.00	33.00	33.00	30.00
Basic, del'd, eastern Pa..	33.75	33.75	33.75	30.00
Basic, Valley furnace....	33.00	33.00	33.00	30.00
Bessemer, Pittsburgh....	37.25	37.25	37.25	35.95
Malleable Bess., Ch'go*..	35.50	33.50	33.50	30.00
Gray forge, Pittsburgh..	32.75	32.75	32.75	29.95
L. S. charcoal, Chicago..	37.50	37.50	37.50	31.75
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	....	....	....	$38.00
O.-h. rails, heavy, at mill	....	....	....	40.00
Bess. billets, Pittsburgh.	$47.50	$47.50	$47.50	60.00
O.-h. billets, Pittsburgh.	47.50	47.50	47.50	60.00
O.-h. sheet bars, P'gh....	51.00	51.00	51.00	60.00
Forging billets, base, P'gh	60.00	60.00	60.00	80.00
O.-h. billets, Phila.....	47.50	47.50	....	60.00
Wire rods, Pittsburgh....	57.00	57.00	57.00	70.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Iron bars, Philadelphia..	3.685	3.685	3.685	3.159
Iron bars, Pittsburgh....	3.50	3.50	3.50	3.25
Iron bars, Chicago.....	3.50	3.50	3.50	3.00
Steel bars, Pittsburgh...	2.90	2.90	2.90	3.00
Steel bars, New York....	3.095	3.095	3.095	3.169
Tank plates, Pittsburgh..	3.25	3.25	3.25	4.25
Tank plates, New York..	3.445	3.445	...	4.419
Beams, etc., Pittsburgh..	3.00	3.00	3.00	3.25
Beams, etc., New York..	3.195	3.195	3.195	3.419
Skelp, grooved steel, P'gh	2.90	2.90	2.90	2.85
Skelp, sheared steel, P'gh	3.25	3.25	3.25	3.00
Steel hoops, Pittsburgh..	3.50	3.50	3.50	3.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire,	Dec. 24, 1917.	Dec. 19, 1917.	Nov. 21, 1917.	Dec. 27, 1916.
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	5.00	5.00	5.00	4.50
Sheets, galv., No. 28, P'gh	6.25	6.25	6.25	6.25
Wire nails, Pittsburgh...	3.50	3.50	3.50	3.00
Cut nails, Pittsburgh....	4.00	4.50	...	2.95
Fence wire, base, P'gh..	3.25	3.25	3.25	2.95
Barb wire, galv., P'gh...	4.35	4.35	4.35	3.85
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	$37.00	$37.00	$35.00	$27.00
Iron rails, Philadelphia..	38.00	38.00	38.00	28.00
Carwheels, Chicago	33.00	31.50	30.00	20.00
Carwheels, Philadelphia..	30.00	34.00	33.00	22.00
Heavy steel scrap, P'gh..	30.00	30.00	29.00	24.00
Heavy steel scrap, Phila.	29.00	28.00	26.00	23.00
Heavy steel scrap, Ch'go	28.50	28.50	28.00	21.50
No. 1 cast, Pittsburgh...	30.00	30.00	26.00	21.00
No. 1 cast, Philadelphia..	30.00	31.00	31.00	21.00
No. 1 cast, Ch'go net ton)	25.50	24.50	23.00	15.50
No. 1 RR. wrot, Phila....	35.00	35.00	35.00	27.00
No. 1 RR. wrot, Ch'go(net)	31.25	31.25	31.00	23.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt...	$6.00	$6.00	$6.00	$9.50
Furnace coke, future....	6.00	6.00	6.00	4.50
Foundry coke, prompt...	7.00	7.00	7.00	10.00
Foundry coke, future....	7.00	7.00	7.00	6.00
Metals,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York..	23.50	23.50	23.50	31.00
Electrolytic copper, N. Y.	23.50	23.50	23.50	31.00
Spelter, St. Louis.....	7.75	7.50	7.75	9.50
Spelter, New York.....	8.00	7.75	8.00	9.75
Lead, St. Louis.....	6.35	6.25	6.37½	7.30
Lead, New York.....	6.50	6.40	6.50	7.50
Tin, New York.....	85.50	85.50	77.00	40.87½
Antimony (Asiatic), N. Y.	15.00	15.00	13.75	14.00
Tin plate, 100-lb. box, P'gh.	$7.75	$7.75	$7.75	$7.00

of new business being placed in iron and steel products is very light. Consumers will put off as much as possible the making of new purchases until after the first of the year, and in addition to this it is very hard to find material of any kind that consumers can get for prompt delivery. It is practically impossible to buy pig iron or semi-finished steel, and it is also very hard to get coke. The shortage in supply of pig iron is seriously restricting output at all the plants of the Steel Corporation, and at many independent steel plants as well. The different sub-committees on steel products of the American Iron and Steel Institute have recently named prices on some additional finished steel articles, and have also made rulings on other commodities, all of which are given elsewhere in this issue. The whole situation in the steel trade is likely to continue quiet until after the first of the year. The belief is strong here that no important changes in prices on pig iron, semi-finished steel and finished steel products will be made on Jan. 1, by the War Industries Board. Any revision in steel prices to a lower basis, would work great injury to the trade at this time, and this is probably recognized by those having to do with these matters.

Pig Iron.—The famine in pig iron that has existed in this district for several months shows no signs of abating. The new inquiry is not so active, but this no doubt comes from the fact that consumers found it impossible to pick up any iron and have simply retired from the market. The purchasing agent of one local steel company said recently that he was quite sure prices on Bessemer and basic iron would be close to $100 per ton now were it not for the Government control of the market. The idea has been advanced that the recent fixing of the price of $33 for pig iron brought about a large expansion in consumption, and that this is partly responsible for the present famine in the supply. Some fair-sized lots of No. 2 foundry and forge iron have recently been shipped into this market from the South. The Sharon Steel Hoop Co. has been in the market recently for basic iron for its open-hearth steel plant at Lowellville, Ohio, and in fact all of the steel companies here would buy any quantities of Bessemer and basic iron that could be had. We note sales of about 27,000 tons of Bessemer iron for delivery over the first half of next year at $36.30, Valley furnace, and 5000 tons of basic iron for the same delivery at $33, Valley furnace. We note sales of 9000 tons of broken ingot molds for delivery over first half of next year at $30 to $36 delivered to consumers in the Pittsburgh district. There are still 18 to 20 blast furnaces in the Pittsburgh, Youngstown and New Castle districts banked for lack of coke, and most of these will likely stay out until after the first of the year. Several consumers of foundry iron have been able recently to place contracts for their needs for first half of 1918 at the regular price of $34, Valley furnace.

We quote as follows: Basic pig iron, $33; Bessemer, $36.30; gray forge, $32; No. 2 foundry, $33; No. 3 foundry, $32.50, and malleable Bessemer, $33.50, all per gross ton at Valley furnace, the freight rate for delivery in the Cleveland and Pittsburgh districts being 95c. per ton.

Billets and Sheet Bars.—There is nothing new to report in the local situation in semi-finished steel. A price of $73 per ton on forging ingots, Pittsburgh has been fixed by the Committee on Iron and Steel Products and approved by the War Industries Board. The Government demand for shell steel is steadily getting heavier and is taking very close to 90 per cent of the output of some of the larger open-hearth steel mills. Recently the Army Ordnance Department distributed additional orders for 400,000 tons of shell steel. None of the steel mills has any steel to sell in the shape of billets or sheet bars, but on the contrary all are running short of steel on account of the scarcity of pig iron and heavy melting scrap. As noted before, soft Bessemer steel is being used whenever possible in place of basic open-hearth.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $47.50, sheet bars $51, forging ingots $73, and forging billets $60 base, all f.o.b. at mill, Pittsburgh or Youngstown.

Ferroalloys.—The new inquiry for alloys is very quiet, consumers evidently being covered over the next several months. We note a sale of 150 tons of 50 per cent ferrosilicon, equal deliveries in first half of next year,

at $170 per ton f.o.b. Pittsburgh. We quote 80 per cent domestic ferromanganese at $250, but on a firm offer this price might be shaded $5 to $10 per ton. We quote 18 to 22 per cent spiegeleisen at $65 to $70 delivered and 50 Bessemer ferrosilicon at $165 to $170 delivered.

We now quote 9 per cent Bessemer ferrosilicon at $54, 10 per cent $55, 11 per cent $58.30, 12 per cent $61.60. We quote 6 per cent silvery iron $40, 7 per cent $42, 8 per cent $44.50, 9 per cent $47, 10 per cent $50. Three dollars per gross ton advance for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, these furnaces having a uniform freight rate of $2 per gross ton, for delivery in the Pittsburgh district.

Structural Material.—It is said that within the past week the Government has placed 8000 to 10,000 tons of structural steel work, but details of these contracts are not given out. The Morgan Engineering Co., the Alliance, Ohio, company which recently placed 4000 tons of shapes with the Bethlehem Steel Co., will need about 3000 tons more for four or five new shops it intends to build. The McClintic-Marshall Co. has taken 950 tons for a crane runway at the Washington Navy Yard and the American Bridge Co. has taken 300 tons of bridge work for the Pennsylvania Railroad. Inquiries in the market include 1900 tons for a new steel bridge contemplated by the Brier Hill Steel Co. at Youngstown, Ohio; 1500 tons for a highway bridge for the City of Columbus, Ohio, and 900 tons for a municipal light plant at Cleveland. Local fabricators say that new inquiry aside from Government work is very quiet. We quote beams and channels up to 15 in. at 3c. at mill, the regular Government price. Local structural steel mills are filled up for some months.

Steel Rails.—Very little is being done in new light rails, but there is a fair inquiry for re-rolled rails. The Carnegie Steel Co. and the Cambria Steel Co. are reported to be filled up on standard sections and light rails for a year or more.

We quote cold-rolled strip steel at $6.50 per 100 lb., f.o.b. Pittsburgh, terms 30 days, less 2 per cent off for cash in 10 days, when sold in quantities of 300 lb. or more.

Plates.—The Emergency Fleet Corporation recently placed about 6000 tons of plates with a Youngstown, Ohio, mill to be shipped to the American Shipbuilding Co. Plate mills in the Youngstown district are furnishing large quantities of material to the Government and work is being rushed as fast as possible on the new plate mills being built by the Brier Hill Steel Co., and the Youngstown Sheet & Tube Co. These new plate mills will be large factors in the plate market in the early summer next year. The supply of plates for prompt shipment seems to be getting less, on account of the heavy increase in the demand for the plates from the Government. Steel car companies that are building cars on Government orders say they are not getting more than 40 to 50 per cent of the quantity of plates they should be receiving. We quote ¼-in. and heavier sheared plates at 3.25c. f.o.b. Pittsburgh, but local mills say they have practically none to sell for prompt delivery.

Sheets.—A good part of the output of the sheet mills on blue annealed and Bessemer black sheets is under contract for first half of next year, and on galvanized for first quarter. The Government demand for sheets is getting steadily heavier, and it is stated that this month the sub-committee on sheet steel has distributed among the mills orders for close to 50,000 tons of sheets of various grades for Government work. A very large part of this quantity of sheets is for shipment to France, for Government work that is going on in that country. It is expected that at any time the Government will issue an order stopping shipments of sheets to consumers that are not making products essential to carrying on the war. Prices on sheets are given in detail on page 1561.

Tin Plate.—There is nothing of interest to report in the tin plate trade. Most mills have practically their entire output sold for first half of 1918, while some mills have a good part of their output for second half of next year under contract. The Government is still buying fair-sized quantities of tin plate, its orders being distributed among the mills by the sub-committee on tin plate, and are rolled and shipped as promptly as possible. Some export shipments of tin plate are being made, but these are mostly on old contracts placed a year ago or more. There is a fairly good demand for stock items and several makers of tin plate say their stocks are lighter now than at any time for several years.

Iron and Steel Bars.—Recently heavy contracts for steel bars for delivery over first half of 1918 and some for delivery over all of next year have been placed by the implement makers, at the regular Government price of 2.90c. at mill, Pittsburgh. It is said, however, that these contracts contain a clause to the effect that at no time will the price of steel bars on these contracts be higher than the regular Government price. Specifications against contracts are reported to be coming in freely and it is said several of the smaller steel bar mills are in position to take orders for fairly prompt delivery. The Government has fixed a price on rail steel bars, rolled from old steel rails, of $3 per 100 lb. We quote steel bars rolled from billets at $2.90 and refined iron bars at $3.50 in carloads, f.o.b., Pittsburgh.

Wire Rods.—Makers continue to report quite an active demand for soft rods, and also for high-carbon rods. The export demand is also heavy, and several local makers are sending fairly heavy shipments of wire rods to Canada and also to France and Italy and the Orient. There have been several fair-sized sales lately of high-carbon rods at $75 to $85 per ton, at maker's mill, prices depending largely on the carbons. Local mills have about all the obligations on soft rods they can take care of in the next two or three months, and one mill is not seeking new orders. Prices on rods are very firm, and are given in detail on page 1561.

Wire Products.—The domestic demand for wire and wire nails is fairly heavy, while the Government demand is very active, and mills have their output well sold up over first quarter of next year. The demand for basic open-hearth steel is still abnormally heavy, and some wire mills that have both Bessemer and open-hearth steel plants are now using Bessemer steel to a large extent in their wire mills, desiring to conserve as much of their output of basic steel as they can to apply on Government orders. The export demand is active, and once in a while a Government permit is issued for foreign shipments of wire and wire nails to neutral countries. The demand from China and Japan, and also from India, for wire and wire nails has been good for some time. While some makers feel that the prices of $3.50 on wire nails, and $3.35 on basic wire are low, it is not believed there will be any change made in prices on wire products by the War Industries Board in the near future. Some mills are not pushing actively the manufacture of wire products, but are diverting as much of their steel as they can to the manufacture of other finished products on which profits are larger. Prices on wire and wire nails are very firm, and are given in detail on page 1561.

Nuts and Bolts.—Government buying is dominatng the entire situation in nuts and bolts, there being practically no new demand from the domestic trade. Every few days the Government puts out inquiries for very large quantities of bolts, which are wanted for as quick delivery as it is possible to get. A recent inquiry comes from the Jeffersonville Arsenal at Jeffersonville, Ind., and is for 40,000,000 bolts. It is not expected this large order will be placed for a week or two, and it is probable it will be divided among four or five makers. All the concerns making nuts and bolts report they are filled up on orders over the next two or three months, and that nearly 100 per cent of the new business being put on their books is for the Government, either on direct or indirect orders. The railroad congestion is holding up shipments to some extent, but delivery of steel by the mills is reported to be fairly good. No lower prices are being made on nuts and bolts than the Government discounts, which are given on page 1561.

Rivets.—A few days ago the International Shipbuilding Co. placed among three or four makers contracts for 4000 tons of rivets, and practically all of the new business being placed is coming from the Government on direct or indirect orders, the demand from domestic

consumers being light. There is some export demand, but makers are not figuring much on this, as they are filled up with Government business for several months. Prices are firm, and we quote structural rivets at $4.65, and cone-head boiler rivets at $4.75 per 100 lb., in carloads, f.o.b. Pittsburgh.

Hoops and Bands.—The new demand is only fair, as consumers are covered for some time ahead. The Government is a fairly heavy buyer of hoops and bands, and for prompt delivery. None of the mills in this district is in position to offer hoops and bands for early delivery, being filled up for some months. The Government prices on steel bands are 2.90c., extras as per the steel-bar card, and 3.50c. on steel hoops, f.o.b. Pittsburgh.

Shafting.—There is very little new buying by the general trade, 80 to 90 per cent of the new business being taken by the shafting makers, coming from the Government on direct or indirect orders. The demand for shafting from the automobile trade has been very dull for some time, but lately has shown a slight increase. Specifications against contracts are only fairly active. We quote cold-rolled shafting, in large and small lots, at 17 per cent off list, f.o.b. Pittsburgh.

Cold-Rolled Strip Steel.—Makers report the new demand from the domestic trade as being very quiet, but the Government is placing fairly heavy orders for cold-rolled strip steel, and there is also a good deal of export inquiry. The demand from the automobile trade is dull. Consumers are not showing much desire to contract ahead, as there is no incentive to do so, nor are the makers anxious to sell for delivery ahead, owing to the uncertainty as to what may be done with prices by the War Industries Board. It is not generally expected that prices on cold-rolled strip steel will be lowered, as the present price of 6.50c. per lb. is regarded as fair by both makers and consumers.

We quote cold-rolled strip steel at $6.50 per 100 lb., f.o.b. Pittsburgh, terms 30 days, less 2 per cent for cash in 10 days, when sold in quantities of 300 lb. or more.

Hot-Rolled Strip Steel.—Makers report the new demand quite active, and that the Government price is being firmly held. We quote hot-rolled strip steel at $4.50 per 100 lb., f.o.b. Pittsburgh.

Railroad Spikes.—The new demand for spikes from the railroads has been very dull for some time, but from jobbers is fairly active. Specifications against contracts placed some time ago by the railroads are coming in only at a fair rate. Standard railroad track bolts are quoted $4.90 per 100 lb.

Wrought Pipe.—It is expected that this week the Philadelphia Co. will distribute among four or five mills its order for about 20,000 tons of iron and steel tubular goods. The company will likely buy more largely this year of steel pipe than for some time owing to the great difficulty in getting iron pipe. The new demand for merchant iron and steel pipe is quiet, and this is also true of butt pipe, especially sizes used for building purposes. The Government is buying fairly large quantities of steel pipe right along, which the mills turn out and ship promptly. Local mills report they are well sold up over the next six months, and one leading mill is filled up over the entire year of 1918. Discounts on iron and steel pipe are given on page 1561.

Boiler Tubes.—Mills making iron and steel tubes, and also seamless-steel tubing, report they are filled up over the next six months or longer, and one leading maker is said to be filled up on steel tubes and also on seamless-steel tubing for about 18 months. Consumers desiring prompt delivery on either iron or steel tubes find it almost impossible to get the material. Some jobbers who have had in stock small quantities of iron and steel tubes have been able to get very high prices for them. Scrap dealers also once in a while pick up small lots of tubes on which they are able to make a nice turn. Discounts on iron and steel tubes are given on page 1561.

Coke.—Owing to the mild weather this week, the supply and also the movement of cars was some better, but is still very far short of being satisfactory, either to coke producers or blast furnaces. On several days the supply of cars was 60 to 70 per cent, but on two other days dropped below 50 per cent. None of the coke operators in any of the regions is able to make a full output of coke, due to scarcity of labor and cars for shipment. When a certain amount of coke piles up in the yard the only thing to do is to close down ovens until cars are secured to move it. The opinion is given here that before long the Federal Trade Commission will allow dealers in coke a commission of at least 25c. per ton for handling it. Very little coke is being sold for prompt shipment, as it is impossible to get it, and it is just as hard to get cars. A good many blast furnaces in the Pittsburgh and Youngstown districts are still banked owing to lack of coke. The Republic Iron & Steel Co. banked its Hannah furnace at Youngstown, Ohio, last week. We quote furnace coke at $6, foundry $7, and crushed coke from 1-in. size $7.30, all per net ton at oven. The *Connellsville Courier* gives the output of coke in the Upper and Lower Connellsville regions for the week ending Dec. 15 as 298,000 tons, a decrease from the previous week of over 9000 tons.

Old Material.—There is no improvement in the local scrap situation, either as regards supply of cars or ability of the dealers to get scrap. Local dealers say they could readily sell very large quantities of scrap at full Government prices if they were able to get it, and also to get cars in which to ship it. There has just come from the subcommittee on scrap iron of the American Iron and Steel Institute some important announcements in regard to prices and rulings on scrap, given elsewhere in this issue. Dealers quote for delivery in Pittsburgh, and other consuming points that take Pittsburgh freight rates, per gross ton, as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$30.00
No. 1 foundry cast	30.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa., and Pittsburgh	38.00 to 39.00
Hydraulic compressed sheet scrap	26.00 to 27.00
Bundled sheet scrap, sides and ends, f.o.b. consumer's mill, Pittsburgh district	24.00 to 25.00
Bundled sheet stamping scrap	21.00 to 22.00
No. 1 railroad malleable stock	37.00 to 38.00
Railroad grate bars	19.00 to 20.00
Low phosphorus melting stock	38.00 to 40.00
Iron car axles	42.00 to 43.00
Steel car axles	43.00 to 44.00
Locomotive axles, steel	51.00 to 52.00
No. 1 busheling scrap	19.00 to 20.00
Machine shop turnings	20.00
Cast-iron wheels	30.00
Rolled steel wheels	36.00 to 37.00
*Sheet bar crop ends	37.00 to 38.00
Cast-iron borings	20.00
No. 1 railroad wrought scrap	35.00
Heavy steel axle turnings	25.00 to 26.00
Heavy breakable cast scrap	26.00 to 27.00

*Shipping point.

Philadelphia

PHILADELPHIA, Dec. 24.

Operating conditions among the eastern Pennsylvania steel mills and blast furnaces are the worst yet experienced. The plants of the Bethlehem Steel Co. and the Midvale Steel & Ordnance Co., which heretofore have been fairly free from serious difficulties, are now troubled by shortage of coal and coke, with production considerably reduced. Among the smaller mills, the situation is still more serious. The Lukens Steel Co. on Saturday had all of its open-hearth furnaces out, with no permanent relief in sight. Executives of the Alan Wood Iron & Steel Co. held a conference on Saturday with officials of the Fuel Administration and the serious conditions prevailing at that plant were pointed out. On Saturday, this company had one blast furnace banked and another about ready to go out and a three days' supply of coal was all that prevented a complete shut-down of all of the steel mills. The Eastern Steel Co.'s open-hearth furnaces are operating with reduced output due to shortage of gas coal. Several merchant blast furnaces are still banked. One of the Warwick furnaces has been banked for the third time in two months. Present troubles could be borne with fortitude by the iron and steel makers if there were any permanent form of relief in sight, but the Fuel Administration and the railroads seem to have broken down completely in their efforts to obtain sufficient coal and coke

supplies. Producers are inclined to trace the difficulty directly to railroad congestion, due to lack of motive power. Instances have been cited of cars of coal lying on sidetracks because of lack of locomotives with which to move them. A steel company, which has its own coal mines and own coke plants, has been unable to get enough cars to move the supplies so urgently needed. Unless the situation is soon greatly improved, the effectiveness of the war program will be seriously impaired by the great falling off in iron and steel production which is now becoming apparent. Some mills estimate that December production will be not much more than 50 to 75 per cent of capacity.

Pig Iron.—Sales of pig iron have come almost to a standstill, not because of any lack of buyers, but because furnace representatives have no more iron to sell for the periods in which it is most urgently needed —immediately and first quarter of 1918. There is an insistent call for prompt delivery, which cannot be met at all, with the exception of an occasional carload or 100-ton lot. With furnace output reduced, producers are not able to keep up with contracts and consequently are obliged to turn down nearly all of the inquiries for prompt iron. At the present rate of production, December deliveries will run in to January, so no encouragement has been given to consumers who want their first quarter deliveries anticipated. Many foundry consumers have come into the market so late that they could not obtain a supply for first quarter and have contracted for second quarter. How their first quarter requirements are to be met is a problem that is not yet solved and possibly for many will not be. With nearly all furnaces sold up for the first half, more interest is now being taken in second half buying and several contracts were placed last week for third quarter delivery. Steel makers are actually begging for iron, particularly basic. Priority orders from Washington are getting more frequent, but the Government authorities are not acting hastily in such matters, as steel makers, almost without exception, are on war work and consequently a priority order simply means taking iron away from one war contractor to give it to another. The shortage of iron is getting more acute. Nearly all furnaces have sold almost up to capacity production for the last quarter of this year and with production so seriously reduced, deliveries have gotten far behind. In selling for first quarter of next year, the furnace representatives have been more conservative. For example, an iron company whose capacity is 22,000 tons per month has sold not more than 18,000 tons per month for first quarter, but unless there is an improvement in the rate of production it will have difficulty in meeting its commitments even on that basis. A New Jersey manufacturer of plumbing supplies is in the market for 1000 tons of No. 2 X foundry and 1000 tons of No. 2 plain for delivery in the second half of 1918. We quote standard grades of iron at furnace, with the exception of Virginia iron, for which the delivered price is quoted:

Eastern Pennsylvania No. 1X	$34.50
Eastern Pennsylvania No. 2X	33
Eastern Pennsylvania No. 2 foundry	33.00
Virginia No. 2 X (including freight)	36.77
Virginia No. 2 foundry (including freight)	36.27
Basic	33.00
Gray forge	32.00
Bessemer	36.30
Standard low phosphorus	53.00
Low phosphorus (copper bearing)	50.00

Coke.—Two of the largest sellers of coke in this district are almost entirely sold up for 1918. It now develops that some very large consumers have not covered for their requirements. In most instances, such consumers have war contracts and have relied upon the Government to obtain coke for them when it was needed. A company which is 100 per cent engaged in ordnance work came into the market last week and found that it could not place its order. An appeal was made to Washington and a large coke seller received a request for priority shipment. Although this seller had been careful to sell his 1918 quota to consumers who have priority work, this case was cited as an example of the fact that Government officials can do little more than take care of each emergency to the best of their ability as it arises. The incident, if repeated many times, as it very likely will be, will mean deflection of large quantities of coke from those who have been farsighted and forehanded to those who have not covered their requirements but have relied on the Government to get a supply for them when needed. There is an urgent demand for coke for prompt delivery, but none is to be had. Occasionally a seller is able to help out a consumer with a carload, but such instances are becoming rarer. The coke situation is not improving, and, if anything, is gradually getting worse.

Ferroalloys.—Ferromanganese shows firmness and there are few, if any, quotations now below $250 per ton for any delivery. Several furnaces are banked. Spiegeleisen is also firmer and the $60 minimum quoted a week ago is disappearing. Sellers now hold for about $62 per ton at furnace.

Billets.—Billets are not to be had in this market. There is a good demand but steel mills have no surplus to offer. We quote $47.50 f.o.b. Pittsburgh for 4 x 4 rerolling billets.

Sheets.—There is no change in this market. A fair amount of business is being done, which would be larger if mills were willing to add to their commitments for first quarter, which under present operating difficulties they are loath to do. We quote No. 10 blue annealed sheets at 4.25c.; No. 28 black at 5c. and No. 28 galvanized at 6.25c., Pittsburgh.

Structural Material.—With large orders on hand for the Government and production curtailed, Eastern structural mills are finding it difficult to ship on existing contracts. Consumers, it appears, are having trouble in placing orders for next year, unless they can obtain priority orders from Washington. A Pennsylvania mill having a capacity of 18,000 tons per month has not shipped more than 14,000 tons in any month this year. Its record for November was slightly more than 11,000 tons and during the first three weeks of December, its total shipment of shapes was less than 7000 tons. Fabricated shops in this district are extremely busy on buildings for the Government and ship sections for the Emergency Fleet Corporation. We quote shapes at 3c., Pittsburgh.

Plates.—A Pennsylvania plate mill, confronted by rising costs of production and present operating difficulties, has refused to accept any more business either for the Government or for companies engaged on Government work on the basis of 3.25c., Pittsburgh. This company explains that the only way in which it was able to avoid a loss was by shipping a part of its output on private contracts placed some time ago at prices higher than that fixed by the Government. Lately, however, its output has been reduced and Government orders are absorbing practically all of the plates it can produce. This company has persistently contended for a higher price on plates. Its position is that it will lose money if it continues on the present basis. Specifications for shipyards are coming in freely. Emergency specifications from the Navy Department frequently come to the Pennsylvania mills because of their proximity to seaboard. We quote plates at 3.25c., Pittsburgh.

Iron and Steel Bars.—A little business is being done in bar iron, but practically nothing in steel bars. We quote bar iron at 3.50c., f.o.b. mill or Pittsburgh base, according to the location of the buyer, and steel bars at 2.90c., Pittsburgh.

Old Material.—The recommendations of the American Iron and Steel Institute (published elsewhere in this issue) are in the nature of a check on advancing prices of old material classifications which were not covered by the price agreement recently reached with the War Industries Board. In this market, steel rails for re-rolling, which have been selling at $38 to $40, delivered, must not be sold now for more than $35, a differential of $5 a ton over the price for No. 1 heavy melting steel being allowed, provided the purchaser is the owner of a mill for re-rolling such rails. Low phosphorus heavy melting steel, which has been selling at $36 to $38, can now be sold for as high as $40 if guaranteed to contain 0.04 per cent or less in phosphorus and sulphur. If not so guaranteed, the price

shall be $5 less. Old carwheels can not now sell for more than $30, delivered, though the current quotation last week was $34 to $36. No. 1 cast, which has been selling at $31 to $33, will be automatically reduced to $30 under the arrangement now agreed to. Railroad malleable, quoted at $30 to $32, will also be sold at not higher than $30. A $5 extra is allowed for cast borings (clean) when sold to chemical plants, gas houses or for purposes other than melting. A commission of 3½ per cent allowed to dealers and brokers is a concession to the larger handlers of scrap, who were gradually being forced out of business. It is difficult to foretell the effect of this new arrangement. Large consumers of scrap may decide to do their buying direct from producers and thus save the commission. On the other hand, the small dealer with a stock on hand may want to sell direct to the steel mills and thus obtain the maximum price, with the commission possibly added. Mills in the Pittsburgh district are anxious to buy steel scrap, but dealers in this market now find it more profitable to sell in eastern Pennsylvania, $29 to $30 being obtained from nearby mills. As not more than $30 can be obtained in Pittsburgh, dealers make a larger profit by selling their supply here, which has not been difficult to do. Pig iron scarcity is driving many mills into the market for scrap. We quote for delivery in eastern Pennsylvania as follows:

No. 1 heavy melting steel	$29.00 to $30.00
Steel rails, rerolling	35.00
Low phosphorus heavy melting	38.00 to 40.00
Low phosphorus (not guaranteed)	33.00 to 35.00
Old iron rails	38.00 to 40.00
Old carwheels	30.00
No. 1 railroad wrought	35.00
No. 1 yard wrought	33.00 to 35.00
No. 1 forge fire	23.00 to 24.00
Bundled sheets	23.00 to 24.00
No. 2 busheling	17.00 to 18.00
Steel turnings (for blast furnace use)	15.50 to 16.00
Machine shop turnings (for rolling mill use)	18.50 to 19.00
Cast borings (for blast furnace use)	15.50 to 16.00
Cast borings (clean)	20.00
No. 1 cast	30.00
Grate bars	21.50 to 22.50
Stove plate	22.00 to 23.00
Railroad malleable	30.00
Wrought iron and soft steel pipes and tubes (new specifications)	30.00 to 32.50

Buffalo

BUFFALO, Dec. 22.

Pig Iron.—Very brisk and eager demand prevails for all kinds of iron for nearby delivery for emergency uses, but the market is practically bare, with everything that is likely to be produced before July 1 booked up. Small lot business would command unprecedentedly high prices, did not Government restrictions prohibit acceptance of premiums. The situation is such with some melters that price cuts no figure, their only concern apparently being to secure iron at the earliest possible moment regardless of grade or cost. For third and fourth quarter delivery, as well as for first half, consumers are after all grades, foundry, malleable, basic and Bessemer, and inquiries for various tonnages are piling up. Furnaces, however, have very little untaken capacity on which they can safely promise delivery for the extended period. Coke conditions and the freight situation show no material improvement and continue to hamper furnace operation badly, though furnacemen hope for a better situation regarding fuel supply after the first of the year, if not complicated by adverse weather conditions. We continue previous price schedules, f.o.b. furnace, Buffalo, as follows:

No. 1 foundry	$34.50
No. 2 X	33.50
No. 3 foundry	32.50
Gray forge	32.00
Malleable	33.50
Basic	33.00
Lake Superior charcoal, f.o.b. Buffalo	39.75

Finished Iron and Steel.—It is understood there has been further buying of wire rods for use of Canadian mills, and that at least a portion of the material ordered will come to the States for shipment during the first quarter of 1918. There has also been considerable further inquiry from Canadian sources for shipbuilding material, aggregating quite a large tonnage, for delivery during the latter part of 1918 and extending into 1919.

Old Material.—The congested railroad situation prevents the development of what otherwise would be an exceedingly active market, with large total of transactions, notwithstanding the increasing scarcity which is becoming more and more apparent in almost all grades of scrap. This is particularly true of heavy melting steel. Embargoes are still in force at all the principal consuming points to which shipments are usually forwarded from the Buffalo district, which places a further limit upon the amount of business that can be transacted, aside from the tonnage called for by local consumers. The price of old car wheels shows a tendency to advance; but this has been checked by the new agreed price, $30. We quote dealers' asking price, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$29.00 to $30.00
Low phosphorus	40.00 to 42.00
No. 1 railroad wrought	34.00 to 35.00
No. 1 railroad and machinery cast	31.00 to 32.00
Iron axles	45.00
Steel axles	45.00
Carwheels	30.00 to 34.00
Railroad malleable	31.00 to 32.00
Machine shop turnings	18.00 to 18.50
Heavy axle turnings	26.00 to 27.00
Clean cast borings	19.00 to 20.00
Iron rails	37.00 to 38.00
Locomotive grate bars	20.00 to 21.00
Stove plate	22.00 to 23.00
Wrought pipe	26.00 to 27.00
No. 1 busheling scrap	26.00 to 27.00
No. 2 busheling scrap	17.00 to 18.00
Bundled sheet stamping scrap	19.00 to 20.00

Cleveland

CLEVELAND, OHIO, Dec. 24.

Iron Ore.—Now that the ore-shipping season has closed, shippers are taking more interest in ore for next season's delivery, and it is expected that representatives of some of the leading ore firms will be called to Washington within the next few days to discuss the price situation with representatives of the Government. While it was generally understood when this season's prices were reaffirmed for this year by the Government that the same prices would prevail during 1918, some ore firms feel that there should be an advance to cover the increased cost in mining that has come since prices were established a year ago. While some reservations have been made, buying for next year has been held back because of the uncertainty as to prices. We quote present prices as follows: Old range Bessemer, $5.95; old range non-Bessemer, $5.20; Mesaba Bessemer, $5.70; Mesaba non-Bessemer, $5.05.

Pig Iron.—Inquiry for basic, foundry and malleable iron for delivery during the first half continues plentiful. New inquiries are pending for several lots of basic iron aggregating 40,000 tons for the first half and second quarter. It is estimated that 250,000 tons of basic iron could be sold at the present time were it available. Cleveland producers have very little first half pig iron left, and consumers are finding it more difficult every day to place orders. It is predicted that before long some foundries doing Government work will find it necessary to ask the Government to secure pig iron for them and that will mean the requisitioning of iron already sold to other customers. Several sales of last half foundry iron were made during the week, including a 2500-ton lot to a northern Indiana melter. Several small-lot sales of Southern high silicon iron are also reported.

Bessemer	$37.25
Basic	33.30
Northern No. 2 foundry	33.30
Southern No. 2 foundry	37.00
Gray forge	32.30
Ohio silvery, 8 per cent silicon	46.12
Standard low phosphorus, Valley furnace	50.00

Coke.—Inquiry for foundry coke contracts has fallen off somewhat, but there is still considerable call from consumers, which brokers are unable to supply because many producers are taking on no additional tonnage. Shipments were better last week owing to improved weather conditions, but are still far from good, and many foundries have a very limited supply.

Finished Iron and Steel.—New inquiry is somewhat lighter, due probably to the holiday season. The 54,000 tons of steel for the 40 boats placed by the Government with the American Shipbuilding Co., has all been distributed, 9000 tons going to the United States Steel Corporation and the remainder to five or six independent mills. The 420 boilers, for which the Emergency Fleet Corporation recently inquired, have been placed with the leading water tube boiler interest. New plate inquiries are light. A Cleveland mill that has been selling at higher prices has now got down to the Government price on plates except for small lots, which it is quoting at 4c. to 4.25c. An Ohio manufacturer wants 2000 tons of blooms for motor truck parts. Some small miscellaneous inquiries are coming out for steel for Government work. The Willys-Overland Co., Toledo, is reported to have taken a large contract for light gun carriages. Manufacturers not working on Government contracts are uncertain about getting steel, and some have sent specifications to mills for their entire first quarter contracts, hoping that by getting in orders early they will secure deliveries. Hard steel bars are quoted at 3c. at mill which is expected to be named as the Government price. Some makers, particularly in the Central West, are complaining that this price is too low considering costs, but in spite of the reduced price some consumers are substituting lower priced soft steel bars as these can be secured for early delivery. We quote warehouse prices as follows: Steel bars, 4.03½c.; plates, 4.38½c.; structural material, 4.13½c.; No. 10 blue annealed sheets, 5.35c.; No. 28 black sheets, 6.35c.; No. 28 galvanized sheets, 7.60c.

Bolts, Nuts and Rivets.—Inquiry for bolts and nuts has quieted down considerably, owing doubtless to the fact that many consumers are deferring the placing of orders until after the first of the year. New inquiry for rivets is not active, but specifications in a large volume are beginning to come on the orders recently placed by the shipbuilding companies. We quote rivets at 4.65c., Pittsburgh, for structural, and 4.75c. for boiler rivets.

Old Material.—The demand for scrap is active, and the market is very firm. Dealers are still making no attempts to sell heavy melting steel scrap, having no inducement to do so, as they are unable to buy this grade lower than the Government price. This situation and other conditions have caused a scarcity in heavy melting steel scrap, and some consumers are substituting in its place hydraulic pressed-steel scrap. As a result, this grade has advanced. Many of the mills are in the market for scrap for delivery after the first of the year. Dealers quote f.o.b., Cleveland, as follows:

Per Gross Ton

Steel rails	$26.00 to $27.00
Steel rails, rerolling	36.00 to 37.00
Steel rails, under 3 ft.	34.50 to 35.50
Iron rails	35.00 to 36.00
Steel car axles	45.00 to 46.00
Heavy melting steel	30.00
Cast borings	18.00 to 18.50
Iron and steel turnings and drillings	18.25 to 18.75
No. 1 railroad wrought	34.00 to 35.00
Hydraulic compressed steel scrap	26.00 to 27.00
Carwheels	26.50 to 27.50
Relaying rails, 50 lb. and over	50.00 to 60.00
Agricultural malleable	22.00 to 23.00
Railroad malleable	28.00 to 29.00
Steel axle turnings	23.00 to 24.00
Light bundled sheet scrap	20.00 to 20.50

Per Net Ton

Iron car axles	$44.00 to $45.00
No. 1 busheling	24.00 to 25.00
No. 1 cast	24.50 to 25.00
Railroad grate bars	18.00 to 18.50
Stove plate	18.00 to 18.50

Cincinnati

CINCINNATI, Dec. 24.

Pig Iron.—A few scattered sales of Southern foundry iron have been made in southern Ohio and Indiana, but little of this iron is strictly No. 2. Occasionally a small lot of high silicon iron is made in the South, but it is sold almost immediately as soon as it appears. The holiday season has not cut off the inquiry for foundry iron, as is usual at this time of the year, and this is taken as an indication that many melters are short for a first half supply. The scarcity of Ohio silvery iron is due not only to the curtailment in production, but also to the unprecedented demand from the foundries which wish to use a higher percentage of scrap in their mixtures. No silvery iron is offered by any of the furnaces for nearby shipment and none is held by dealers. Railroad embargoes continue to give a great deal of trouble, but delayed shipments probably cause more annoyance. It is almost a common occurrence now for cars of iron from the Birmingham district to be delayed en route from three to four weeks. Based on freight rates of $2.90 Birmingham and $1.26 from Ironton, we quote f.o.b. Cincinnati as follows:

Southern coke, No. 2 foundry and 2 soft	$35.90
Southern Ohio coke, No. 2	34.26
Basic, Northern	34.26

Finished Material.—Jobbers report business as being very quiet and they do not look for any improvement until well along in January. Mill shipments are delayed, but so far warehouse stocks have not been depleted to such an extent that small urgent orders could not be filled promptly. Wire nails, which are unchanged at $4.10 per keg base, are not in demand, and orders from retailers are for very small quantities. The mill quotation on No. 28 black sheets is 5.18½c., and No. 28 galvanized sheets 6.43½c., f.o.b. cars Cincinnati or Newport, Ky. Store prices are as follows: Iron and steel bars, 4.08½c.; twisted bars, ¾ x 1¼-in., 4.23½c.; ⅝-in., 4.33½c.; ½-in., 4.43½c.; ⅜-in., 4.63½c, and ¼-in., 4.88½c. Structural shapes are 4.18½c.; plates, ¼ in. and heavier, 4.43½c.; No. 10 blue annealed sheets, 5.43½c. Cold rolled shafting carries a 10 per cent discount from list.

Coke.—Both furnace and foundry coke cannot be bought for prompt shipment in any field. The oven operators are troubled more than ever on account of labor shortage, as many men have laid off for the holidays. Coupled with the reduced production, the car shortage is again becoming more serious after a slight improvement noted the first part of last week. An additional number of pig iron furnaces will be compelled to bank within the next few days unless there is some improvement in the supply of 48-hr. coke. The foundries are in little better shape, but supplies on hand are exceedingly limited. New River and Pocahontas operators are still unwilling or unable to take on future contracts, but some Connellsville and Wise County grades can be contracted for on extended deliveries.

Old Material.—Dealers are not endeavoring to make any sales. The local foundries are purchasing only small lots of cast scrap to fill immediate requirements. Shipments to Pittsburgh territory are still delayed very much, and in a number of cases cars have been lost en route for almost an indefinite period. No change in prices are quoted on any grade. The following are dealers' prices, f.o.b. cars, southern Ohio and Cincinnati:

Per Gross Ton

Bundled sheet scrap	$17.50 to $18.00
Old iron rails	32.00 to 32.50
Relaying rails, 50 lb. and up	44.00 to 44.50
Rerolling steel rails	33.00 to 33.50
Heavy melting steel scrap	25.50 to 26.00
Steel rails for melting	24.50 to 25.00
Old carwheels	27.00 to 27.50

Per Net Ton

No. 1 railroad wrought	$29.00 to $29.50
Cast borings	13.00 to 13.50
Steel turnings	13.00 to 13.50
Railroad cast	18.50 to 19.00
No. 1 machinery	25.00 to 25.50
Burnt scrap	14.00 to 14.50
Iron axles	40.00 to 40.50
Locomotitve tires (smooth inside)	33.50 to 34.00
Pipes and flues	15.00 to 15.50
Malleable cast	19.50 to 20.00
Railroad tank and sheet	14.50 to 15.00

St. Louis

ST. LOUIS, Dec. 24.

Pig Iron.—The unsatisfied demand for pig iron continues as strong, even stronger than ever and with decreasing prospects of its being met. Sales continue to be made, it is true, but these are all of analyses off the standard run and the iron is taken by foundrymen

desperate for material. No representatives are in position to take any orders for other than specified quantities of such iron as the furnaces have on hand out of the usual analyses. The sales generally are for lots around 100 tons or less. Among the transactions of the week was one for 100 tons of spiegeleisen, for use in reducing the quantity of ferro-manganese needed by the user.

Coke.—Transactions in coke continue to be limited by the situation as to output and cars with the result that even old customers are being sold reduced quantities. The transactions of the week have been for small lots of 150 tons and downward. By-product coke is entirely out of the market.

Finished Iron and Steel.—In finished products, the situation shows no change from preceding reports. The last contract for standard section steel rails remaining unchanged has been adjusted to open-hearth at $2 advance and deliveries are promised in satisfactory time to the contracting railroads. Movement out of warehouse has been heavy as usual, governed only by the ability of the warehouses to supply the requirements. For stock out of warehouse, we quote as follows: Soft steel bars, 4.17c.; iron bars, 4.17c.; structural material, 4.27c.; tank plates, 4.52c.; No. 8 sheets, 5.47c.; No. 10 blue annealed sheets, 5.52c.; No. 28 black sheets, cold rolled, one pass, 6.52c.; No. 28 galvanized sheets, black sheet gage, 7.77c.

Old Material.—Inability to get scrap and also the shortage of cars have led to a stronger feeling in the old material market during the past week, although there has been very little actual business transacted. Dealers' generally are feeling better, though the readjustment to meet the Government price fixing is still something of a problem because of the unwillingness of holders of scrap to take less than Government figures and the ultimate consumer to pay more than that figure, leaving the dealer to make nothing. We quote dealer's prices, f.o.b. consumer's works, St. Louis industrial district, as follows:

	Per Gross Ton	
Old iron rails	$35.25 to	$35.75
Old steel rails, rerolling	36.75 to	37.25
Old steel rails, less than 3 feet	37.25 to	37.75
Relaying rails, standard section, subject to inspection	60.00 to	75.00
Old carwheels		30.00
No. 1 railroad heavy melting steel scrap	27.75 to	28.25
Heavy shoveling steel	26.25 to	26.75
Ordinary shoveling steel	25.25 to	25.75
Frogs, switches and guards cut apart	28.25 to	28.75
Ordinary bundled sheet scrap	19.25 to	19.75
Heavy axle and tire turnings	19.25 to	19.75
	Per Net Ton	
Iron angle bars	$34.75 to	$35.25
Steel angle bars	27.25 to	27.75
Iron car axles	43.50 to	44.00
Steel car axles	41.50 to	42.00
Wrought arch bars and transoms	38.25 to	38.75
No. 1 railroad wrought	31.25 to	31.75
No. 2 railroad wrought	29.75 to	30.25
Railroad springs	32.75 to	33.25
Steel couplers and knuckles	29.75 to	30.25
Locomotive tires, 42-in. and over, smooth inside	31.75 to	32.25
No. 1 dealers' forge	22.00 to	23.00
Cast iron borings	17.25 to	18.25
No. 1 busheling	23.75 to	24.25
No. 1 boilers, cut to sheets and rings	20.25 to	20.75
No. 1 cast scrap	23.75 to	24.25
Stove plate and light cast scrap	17.25 to	17.75
Railroad malleable	25.75 to	26.25
Agricultural malleable	21.75 to	22.25
Pipes and flues	21.25 to	21.75
Railroad sheet and tank scrap	19.75 to	20.25
Railroad grate bars	18.25 to	18.75
Machine shop turnings	17.25 to	17.75
Country mixed sheet scrap	18.75 to	19.25
Uncut mixed railroad scrap	21.25 to	21.75

Chicago

CHICAGO, Dec. 24.

The shortage of fuel is not relieved, and great anxiety is caused by the lessened production. The Steel Corporation is more than ever short of pig iron and is buying old material on an extensive scale, paying $30 for heavy melting and shoveling steel. Insufficient coke has caused the blowing out of one furnace at Gary and another at South Chicago. Two are banked at South Chicago and two at Joliet, making six which are idle. As to other furnaces, the management is holding its breath. Government orders continue heavy, more coming every day. The leading independent to-day received an order for 6000 tons of plates and shapes, mostly the former, from the American International Shipbuilding Corporation, ultimate delivery to be at Hog Island, Philadelphia, after leaving the hands of the fabricators. The same maker received an order to-day for 5000 tons of ship rivets for delivery in 1918 to the Emergency Fleet Corporation. Pig-iron inquiry for the last half is heavier. Bars and plates are moving in a small way at Government prices.

Pig Iron.—Instead of the usual holiday quiet, inquiry for pig iron was resumed with greater force than ever last week. It came from all directions, and not a few consumers wanted iron for last-half delivery. A producer of Southern iron has not yet sold for all of the last half, but has made a number of sales running into the third quarter. It is willing to sell for the last six months of the year, and this is the attitude of other makers, also. It is the opinion of the trade that the first of the year will bring an active demand for last half. In all cases, sales are based on the official price of $33, furnace. Consumers are taking all the Northern iron they can get, and inasmuch as this is mostly low in silicon, they want high silicon Southern iron to help out their mixtures, the call being for iron running 2.25 per cent silicon and higher. It is agreed that the pivotal thing in iron is the fuel supply, and that much depends on the extent to which the steel companies are obliged to seek iron outside of their own production. The present scarcity of fuel is so bad that even foundries have had to curtail their output. The largest Southern producer is practically the only seller in the South. Other makers are out of the market, being as nearly sold up for the first half as they dare to go in view of the uncertainty of coke supply. With the silveries the situation is unchanged, no offerings being made. Prices are unchanged, as follows:

Lake Superior charcoal, Nos. 2 to 5	$37.50
Lake Superior charcoal, No. 6 and Scotch	40.00
Northern coke foundry, No. 1	33.50
Northern coke foundry, No. 2	33.00
Northern coke foundry, No. 3	32.50
Northern high-phosphorus foundry	33.00
Southern coke No. 1 foundry and 1 soft	38.50
Southern coke No. 2 foundry	37.00
Malleable Bessemer	33.50
Basic	33.00
Low-phosphorus (copper free)	53.00
Silvery, 7 per cent	44.54

Ferroalloys.—Eighty per cent ferromanganese is active in small lots at $240 to $250.

Plates.—In a small way, plates are being sold principally by Eastern mills to non-war users. The large Western makers have their hands full in caring for Government needs and plates embraced the greater part of 6000 tons placed to-day with the leading independent by the American International Shipbuilding Company for delivery at Philadelphia after fabrication. Prices are unchanged. The warehouse quotation is 4.45c.

Bars.—Mild steel bars are being sold in fair quantities where the specifications are attractive. A few implement makers have inquired, but they are not in a hurry to buy. Makers of rail carbon bars have not received official word that 3c. is to be the price for their produce. The quotation has been around 3.25c. Bar iron is quiet and prices are unchanged.

We quote warehouse prices for Chicago delivery as follows: Soft steel bars, 4.10c.; bar iron, 4.10c.; reinforcing bars, 4.10c.; base, with 5c. extra for twisting sizes ½ in. and over and usual card extras for smaller sizes; shafting, list plus 10 per cent.

Shapes.—Few shapes are being sold except for war purposes. No new car business is reported. Unknown bidders will supply 404 tons to the Scherzer Rolling Lift Bridge Co. for a bascule bridge over Tonawanda Creek, Tonawanda, N. Y., and 182 tons for 50 portable-steel buildings for the Sinclair Refining Co. The Bethlehem Steel Bridge Corporation will furnish 180 tons in the form of a bridge at St. Louis for the Missouri Pacific Railroad. The Stupp Bros. Bridge & Iron Co. will supply 100 tons for an extension to a crane runway for the Curtiss & Co. Mfg. Co., St. Louis. Prices are unchanged.

Sheets.—The demand for export and domestic consumption is good. One maker is selling black, galvanized and blue annealed. Another mill is not quot-

ing on black and galvanized because it has oversold for the first quarter. Prices are unchanged.

We quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 5.45c.; No. 28 black, 6.45c.; and No. 28 galvanized, 7.70c.

Cast-Iron Pipe.—It was announced, Dec. 22, that prices had been reduced $1.15 per ton, following a conference of the leading makers and representatives of the Government. Jackson, Mich., after revising its specifications, placed 167 tons with the United States Cast Iron Pipe & Foundry Co. On Jan. 4, Winnipeg, Man., as previous stated, will take bids on 4500 tons, and Madison, Wis., on 200 tons. Quincy, Ill., is inquiring tentatively on 400 tons.

Quotations per net ton, Chicago, are as follows: Water pipe, 4-in., $57.35; 6-in. and larger, $54.35, with $1 extra for Class A water pipe and gas pipe.

Wire Products.—There are plenty of orders, but production is disappointing. Prices are unchanged.

Nails, $3.50, Pittsburgh; plain fence wire, $3.25; painted barb wire, $3.65; galvanized barb wire, $4.35; polished staples, $3.65, and galvanized staples, $4.35.

Bolts and Nuts.—Business is good, but buying somewhat less active than ten days ago, largely because some consumers appear to believe that official prices may be lowered. Prices are unchanged.

Store prices are as follows: Structural rivets, 5.50c.; boiler rivets, 5.60c.; machine bolts up to ⅞ x 4 in., 37½ per cent off; larger sizes, 25-5; carriage bolts up to ⅞ x 6 in., 30-2½; larger sizes, 20; hot pressed nuts, square tapped, $1.05 off, and hexagon tapped, 85c. off per 100 lb.; coach or lag screws, gimlet points, square heads, 40 per cent off.

Old Material.—The Steel Corporation has been a heavy buyer of heavy melting and shoveling steel, paying $30 flat for all grades. The International Harvester Co. has bought heavily of cast scrap for delivery at Milwaukee. The market has been a little excited in the face of the good demand, offerings being under par. The railroad lists are small. Dealers are awaiting the official price announcement. Leading brokers regard favorably the recommendation that they receive 3½ per cent commission from buyers, that per cent being more than they are receiving on business they are putting through. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	$37.00 to $38.00
Relaying rails	50.00 to 55.00
Old carwheels	33.00 to 34.00
Old steel rails, rerolling	35.50 to 36.50
Old steel rails, less than 3 ft.	33.50 to 34.50
Heavy melting steel scrap	30.00
Frogs, switches and guards, cut apart	30.00
Shoveling steel	29.00 to 30.00
Steel axle turnings	24.00 to 25.00
Per Net Ton	
Iron angles and splice bars	$36.50 to $37.50
Iron arch bars and transoms	37.50 to 38.50
Steel angle bars	26.50 to 27.50
Iron car axles	45.00 to 46.00
Steel car axles	43.00 to 44.00
No. 1 railroad wrought	31.25
No. 2 railroad wrought	29.00 to 30.00
Cut forge	29.00 to 30.00
Pipes and flues	23.00 to 23.50
No. 1 busheling	25.00 to 25.50
No. 2 busheling	17.25 to 17.50
Steel knuckles and couplers	32.00 to 33.00
Coil springs	39.00 to 40.00
No. 1 boilers, cut to sheets and rings	19.00 to 20.00
Boiler punchings	31.50 to 32.50
Locomotive tires, smooth	33.50 to 34.50
Machine-shop turnings	17.00 to 17.50
Cast borings	16.50 to 17.00
No. 1 cast scrap	25.50 to 26.50
Stove plate and light cast scrap	20.50 to 21.00
Grate bars	20.00 to 21.00
Brake shoes	21.00 to 22.00
Railroad malleable	27.00 to 28.00
Agricultural malleable	24.00 to 25.00
Country mixed scrap	20.50 to 21.00

New York

NEW YORK, Dec. 24.

Pig Iron.—Inquiry for delivery the last half of next year is increasing in volume, but sellers are not disposed to take on business except from a few favored customers. The market is quiet, as it usually is during the holidays, but the demand is greater than the available supply. Some fear has been entertained that prices might be reduced by the Government. For early delivery we quote as follows:

No. 1 X	$35.25
No. 2 X	34.25
No. 2 Plain	33.75
No. 2 Southern (rail and water)	$38.75 to 39.25
No. 2 Southern (all rail)	39.15 to 39.65
No. 2 X Virginia	37.00 to 37.25

Ferroalloys.—The market for domestic ferromanganese is strong at $250, with sales of carload lots at this price in the past week. The 350 tons reported under inquiry last week has been closed at $245 for delivery in the first half. No decision is announced as to the 1200 tons additional that has been before the market. Demand in general has been of small proportions in the last few days. Spiegeleisen is unchanged at $60, furnace, and inquiry is still pending for 1800 tons. As illustrating general conditions it is interesting to note that one producer of spiegeleisen and ferromanganese is inquiring in the market for both of these products to fill contracts which it will be unable to complete itself. There is nothing to report in the 50 per cent ferrosilicon market.

Finished Iron and Steel.—On an export order of several hundred tons of plates a quotation of 7c. has been made. The Paris & Orleans Railroad has placed a 325-ton order in Cleveland, it is understood, for a little under 5c. at mill. In the lighter weights, plates are more easily obtained at 60 days' delivery. In other products similar deliveries can also be made, but business has been dull and export inquiries have not resulted in much business, largely for the reasons outlined in this column last week. We quote mill shipments of steel bars at 3.095c., New York; shapes 3.195c., plates 3.445c. and bar iron 3.695c., New York. Out of store prices are 1c. higher, and to all must be added 3 per cent of the freight charge for the transportation tax.

Old Material—The recommendations of the Government and dealers in regard to prices of old material will be received with keen interest by all scrap dealers. One of the most interesting features is the provision that recognized scrap dealers or brokers may be paid a commission not to exceed 3½ per cent on actual delivered prices of the metal purchased. This is regarded as a fair commission. Recently on account of the uncertainty as to commissions, conditions have been very unsatisfactory for both buyers and sellers. The recommendation placing rerolling rails at $35, or $5 over the base price of heavy melting steel, will result in sharp reductions, as this grade of scrap has been selling at from $38 to $39, New York. Old car wheels, which have been selling at $33 to $35, and in some cases even higher, will be reduced to about $31 as soon as the action in regard to prices becomes known. We quote prices of brokers as follows to New York producers and dealers, per gross ton, New York:

Heavy melting steel scrap (for shipment to eastern Pennsylvania	$26.00 to $26.50
Old steel rails (short lengths) or equivalent heavy steel scrap	26.00 to 26.50
Relaying rails	60.00 to 70.00
Rerolling rails	38.00 to 39.00
Iron and steel car axles	41.00 to 42.00
No. 1 railroad wrought	32.00 to 33.00
Wrought-iron track scrap	32.00 to 33.00
No. 1 yard wrought long	32.00 to 33.00
Light iron	9.00 to 10.00
Cast borings (clean)	17.50 to 18.00
Machine-shop turnings	17.50 to 18.00
Mixed borings and turnings	14.00 to 15.00
Wrought-iron pipe (1 in. minimum diameter), not under 2 ft. long	28.00 to 28 50

Dealers in New York and Brooklyn are quoting as follows to local foundries, per gross ton, but for delivery to cupola platforms of Brooklyn foundries about $3 more is quoted:

No. 1 machinery cast	$29.00 to $30.00
No. 1 heavy cast (column, building materials, etc.)	23.00 to 24.00
No. 2 cast (radiators, cast boilers, etc.)	23.00 to 24.00
Stove plate	20.00 to 21.00
Locomotive grate bars	20.00 to 21.00
Malleable cast (railroad)	29.00 to 30.00
Old carwheels	33.00 to 35.00

Cast-Iron Pipe.—The action of the Government and manufacturers in fixing a base of $55.35, f.o.b. New York, for 6-in. and larger, class B or heavier, cast-iron pipe, is regarded as fair and in line with recent nominal quotations. Lower prices have been made in case of sales to the Government. We quote the new prices: $55.35 New York, for 6-in. and heavier, and $58.35 for 4-in.; $65.35 for 3-in., and $1 additional for class A or gas pipe. It is expected that business will soon show improvement, as the delay in determining prices has had a depressing effect.

British Steel Market

Government Takes Control of Electric-Steel and Shell Discard Market—American Steel Quiet

(By Cable)

LONDON, ENG., Dec. 24.

Electric steel and shell discards have been taken under control by the Government. Closer supervision of Cleveland pig iron is expected. Hematite iron is urgently wanted. American semi-finished steel is in poor demand. Tin plates are firmer but quoted at 31s. 6d. basis including tin allowance. Ferromanganese is quiet with sellers asking $250 c.i.f. for forward shipment to North American Atlantic ports. We quote as follows:

Tin plates coke, 14 x 20; 112 sheets, 108 lb., f.o.b. Wales, 31s. 6d.
Ferromanganese $250 c.i.f. nominal for export to America.
Ferrosilicon, 50 per cent, c.i.f. £35 upward.
On other products control prices are as quoted in THE IRON AGE of July 19, p. 171.

(By Mail)

Advance in Tin Plate—The Pig-Iron Situation—Ferromanganese for America Higher

LONDON, ENGLAND, Dec. 4.—The situation remains uncertain pending the long-looked-for official announcement in regard to the procedure to be adopted to meet the increased cost of production. The cause of the delay is inexplicable as it is understood that all the facts have been discussed ad nauseam and that a solution was practically arrived at regarding a subsidy. Possibly some other decision may be in contemplation, and it is also suggested that the basic maximum prices of Cleveland and Lincolnshire foundry, forge and basic irons are about to be raised. Meantime Cleveland makers are already asking for the home trade an advance of 2s. 6d. at 95s. for No. 3 and 116s. 6d. f.o.b. for export to Allies. These quotations, of course, are subject to official sanction.

There is ample evidence of a steady expansion of the home outlet for pig iron, which is not surprising in view of the ever-growing war requirements, and a good deal of leeway has yet to be made up to keep pace with demands for steelmaking material. A much heavier run of applications for Cleveland common iron has come forward for the current month and there is some doubt whether these will be met in full, although there are considerable arrears arising from the short November deliveries due to the shortage of cars. Users are doubtless rather short of stock, but given better transport conditions a lot of iron will probably pass into their hands. The increased output of basic iron has only been possible by turning furnaces from Cleveland iron on to the former, and for this reason a closer supervision may have to be exercised over allocations of Cleveland iron. Exports to France have fallen off and clearances to Italy are hindered by tonnage scarcity. The domestic stringency in hematite is becoming more marked in spite of the more restricted demand from Allies.

Semi-finished steel is unchanged, the negotiation of orders outside of recognized war work being almost impossible, and the official quotation of Welsh bars and billets remains as before at £10 7s. 6d. delivered. Although the market in American material is still confined to small dimensions widely divergent prices have been recorded in wire rods arising from the big difference between the freight rates ruling for neutral tonnage and the comparatively low charges for Government room. Business was done recently down to £20 10s. and also up to £25 c.i.f. Liverpool. The terms now quoted are about £24, but the market is chiefly nominal.

Finished steel is quiet in spite of a ceaseless demand. Under present conditions works, whose chief anxiety is to get rid of arrears, seem content to await events. There is some grumbling at the extent to which the margin of profit to the mills has been whittled down through the substantially increased costs incurred in recent months. In fact some argue that a profit can only be secured by balancing one class of material against another. There is no end to the extension of Government work, and the output in shipbuilding and engineering easily beats all previous records. Current quotations for uncontrolled material are unchanged, but the tendency is strong. Bar iron mills are practically booked to the end of next quarter and in most cases are declining new orders.

Apart from the additional orders placed for tin plates recently for France, whose needs now seem satisfied, there has been no further special development in demand, although home consumers show more inclination to cover their needs where permit facilities are afforded. Quotations have risen on the constant advance in the price of tin, the full maximum terms asked to-day, basis 20 x 14 with tin at £293, being 31s. 3d. There has been, however, rather more competition for new orders just lately for December delivery arising not only from the lack of permits, but from delayed specifications against current contracts. Concessions are thus secured varying from 3d. to 9d. per box. Makers, however, insist on the full basis for forward contracts and are not anxious sellers.

Ferromanganese is virtually unchanged and there is very little stirring at present, but the terms recently quoted for Continental ports at about £60 f.o.b. for loose for forward shipment have been well sustained, with a small business done thereat and higher. The bids made lately for the American North Atlantic ports at about $250 and $260 c.i.f. for January-June have been declined, the few sellers in evidence asking $270. The price of £25 to the home trade is still awaiting a revision.

Patriotic Address of Associated Employers of Indianapolis

The Associated Employers of Indianapolis, Inc., has issued a holiday address, in part as follows:

Yule-tide of all seasons, is one of exceptionally good cheer. We extend to you our sincerest compliments and well wishes—Merry Christmas and Happy New Year.

This Christmas in particular should be serenely beautiful and sacredly inspiring. It should in every way be of the utmost significance to a free, enlightened and Christian people, living a righteous life and carrying on our peaceful vocations according to law, necessity and conscience.

"The Kid Has Gone To The Colors." Thousands upon thousands just like him—patriotic men and boys—have heard, heeded and answered their country's call. More will follow. There will be no cessation in our support of them. May they all return safely—and victoriously.

Let us who must stay at home think less about our personal rights and privileges and more of our duty. When we think of the great sacrifices the boys who have gone to the front are making for us and their and our country—let us face the New Year with renewed determination, hope, faith and optimism.

Let us continue to strive as a patriotic and united people, for a righteous peace on earth—freedom, justice and goodwill to humanity—that we may perpetuate our inalienable right to life, liberty and the pursuit of happiness, guaranteed to us under the laws of God and man, by the Constitution of the United States.

Let us in this grave period of war, in this great crisis for the supremacy of democracy over autocracy, be brave and strong, and glad and thankful for the divine guidance of the supreme power and holy influence which must eventually and finally determine our destiny.

Let us in this hour of national peril, and at this season of the year, firmly resolve to be ever considerate of our country's needs and of the rights of others. Let us not give a moment's heed to one thought that might attempt to interpose itself between our personal rights under normal conditions and our duty in the present crisis, for the issue involved is the life or death of our nation.

Let us help propagate the doctrine that "It matters not what a man claims as a reason for justifying the retarding or holding back of our war activities. We must stand on results. This Nation, if it is to do its full duty, must work as it never worked before. We must all stand together, and back with united effort the great enterprise in which we are now engaged."

The American Wood Working Machinery Co., New York, with present offices at 30 East Forty-second Street, has leased space on the eighteenth floor of the Equitable Trust Building, now being erected at Madison Avenue and Forty-fifth Street, dating from May 1, 1918, for new offices.

Metal Markets

The Week's Prices

Cents per pound for early delivery

	Copper, New York		Tin,	Lead		Spelter	
Dec.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
19	23.50	23.50	85.50*	6.40	6.25	7.75	7.50
20	23.50	23.50	85.50*	6.45	6.30	7.75	7.50
21	23.50	23.50	85.50*	6.50	6.35	7.75	7.50
22	23.50	23.50	85.50*	6.50	6.35	7.75	7.50
24	23.50	23.50	85.50*	6.50	6.35	8.00	7.75

*Nominal.

The markets continue dull and featureless. Copper, in its controlled condition, offers no developments. Tin continues scarce and nominal at high prices. Lead is again firm but inactive. Spelter is a little stronger in tone but dull. Antimony is still lifeless.

New York

Copper.—There seems adequate ground for believing that there will be no change in the Government price of 23.50c. per lb. for all grades of copper for at least the first quarter. There appears to be no valid reason for a change up or down. It also seems certain that production will be entirely sufficient to meet all war and commercial needs for at least a few months. With these two prime factors apparently settled and with the market absolutely controlled as to sales and distribution by the Copper Producers' Committee, satisfaction pervades the industry at present. Sales are being made for prompt, early and first-quarter delivery at 23.50c. to large buyers and at 24.67½c. to small buyers, which are the quotations.

Tin.—The quietness which has pervaded the market in all positions and grades for some time still continues, with its scarcity pronounced and unrelieved. Probably sales of 50 tons a day of prompt and for future metal represents the average business the past week. Spot Straits is still practically unobtainable, and in the absence of any sales in this market we quote it nominal at 85c. to 86c. New York. There is distinct dissatisfaction in some quarters with the import license matter because of delays. It is causing financial loss and serious inconvenience. It has happened in more than one case that, because of such delays and after the greatest pains have been taken to comply with all details, the tin has gone into general stores because the import license arrived just too late. Arrivals to Dec. 21 inclusive have been 1225 tons, with 4400 tons reported afloat. The London market is still advancing the quotation for spot Straits on Dec. 21, having been £309 10s. or £4 10s. above that on Dec. 19.

Lead.—The tone of the market, which was a little easier a week ago, has turned firm again with quotations yesterday at 6.50c. New York, or 6.35c. St. Louis in the outside market, and with 6.25c. New York quoted by the leading producer. This firmness is not due to active demand, but to an unwillingness on the part of sellers, who are in a comfortable position so far as orders are concerned. Delays in transit are a disturbing factor. A fair amount of export business was put through early in the week, with more business being negotiated since.

Spelter.—It develops that the bids on 1000 tons of grade C spelter, asked for by the Government for delivery in the first half and submitted last Friday, Dec. 21, ranged from 7.87½c. to 8.60c., New York, the New Jersey Zinc Co. being the low bidder. These prices were higher than generally expected by the trade and have created a better tone, at least temporarily. As a result, while the market is very quiet, it is regarded as a little stronger at 7.75c., St. Louis, or 8c., New York, which was quoted on Monday for prime Western for early delivery, this being nearly the same as grade C. No sales at this level are, however, reported. Last Saturday bids were also received on 4000 tons of grade C for the army, but the details are not made public yet. The quotations for future delivery are from ⅛c. to ¼c. per lb. higher than for early delivery.

Antimony.—The market is dull and unchanged at 15c. per lb., duty paid, New York, for Chinese and Japanese grades.

Aluminum.—No. 1 virgin metal, 98 to 99 per cent pure, is unchanged at 36c. to 38c. New York, for early delivery, with the demand poor.

St. Louis

DEC. 24.—The nonferrous metals continue quiet and with little change in price. The close to-day was for car load lots: Lead, 6.50c.; spelter, 7.50c. In less than car load lots the prices are: Lead, 6.75c.; spelter, 8.25c.; tin, 90c.; copper, 25.12c.; Asiatic antimony, 18c. In the Joplin district the production continues to be hampered by the weather conditions, while the producers are disinclined to sell their ore at the prevailing prices. In consequence there is little or no activity. The basis range for zinc blende, 60 per cent metal, is $50 to $70 per ton, with the average for the week for the district $58 per ton. Calamine basis of 40 per cent metal, ranges from $32 to $37 per ton with the average for the week for the district $35 per ton. Lead continues steady basis of 80 per cent metal, at $75 per ton with the average for the week for the district at $74 per ton. We quote dealers' buying prices for miscellaneous scrap metals as follows: Light brass, 10c.; heavy yellow brass, 15c.; heavy red brass and light copper, 19.50c.; heavy copper and copper wire, 20c.; zinc, 5c.; lead, 5.50c.; tea lead, 5c.

Pulverized Coal to Replace Natural Gas

Owing to the great shortage of natural gas in Western Pennsylvania, Eastern Ohio and West Virginia, practically all the manufacturers in those districts have been advised by the companies supplying them with natural gas that after Jan. 1 the service will be discontinued. This has led to some of these concerns putting in plants for pulverizing coal, which will be used in the future for fuel. The Bonnot Co., Canton, Ohio, has contracts for the installation of coal pulverizing plants of the Holbeck system for various companies as follows, the pulverizers being accompanied by dryers and distribution systems:

McKeesport Sheet & Tin Plate Co., McKeesport, Pa. Two 5-ton pulverizers for 88 sheet and pair furnaces, 28 annealing ovens and 73 tin pots.

Phillips Sheet & Tin Plate Co., Clarksburg, W. Va. Four 1¼-ton pulverizers, serving 24 sheet and pair furnaces, 9 annealing ovens and 28 tin pots.

Mansfield Sheet & Tin Plate Co., Mansfield, Ohio. Two 1¼-ton pulverizers, serving 24 sheet and pair furnaces and 30 annealing ovens.

American Rolling Mill Co., Middletown, Ohio. Two 1¼-ton pulverizers, serving 8 sheet and pair furnaces and 13 annealing ovens.

Carnahan Tin Plate & Sheet Steel Co., Canton, Ohio. Two 1¼-ton pulverizers, serving 16 sheet and pair furnaces, 8 annealing ovens and 12 tin pots.

Heppenstall Knife & Forge Co., Pittsburgh. One 5-ton pulverizer for 14 forge furnaces and several boilers.

Hubbard & Co., Pittsburgh. Four 1¼-ton pulverizers, for 127 furnaces of different kinds.

Trumbull Steel Co., Warren, Ohio. Two 5-ton pulverizers, serving 62 sheet and pair furnaces, 15 annealing ovens, 31 tin pots and 8 galvanizing pots.

Pressed Steel Car Co., McKees Rocks, Pa. Two 5-ton pulverizers for approximately 106 different furnaces.

Liberty Steel Co., Warren, Ohio. Two 1¼-ton pulverizers, serving 8 sheet and pair furnaces, 8 annealing ovens and 12 tin pots.

Union Rolling Mill Co., Cleveland. Two 1¼-ton pulverizers for continuous billet heating and puddling furnaces.

Warwood Tool Co., Wheeling, W. Va. One 1¼-ton pulverizer, serving approximately 22 forge furnaces.

Verona Tool Co., Verona, Pa. One 1¼-ton pulverizer, serving a number of forge furnaces.

The Champion Tool Works, Cincinnati, whose plant was reported last week as having been taken over by the Greaves-Klusman Tool Co., Cincinnati, is moving to a new plant at Winton Place, near Cincinnati, and will increase its output of lathes. The old Champion plant will be used as an addition to the Greaves-Klusman plant.

The Grimes Molding Machine Co. will be the new corporate style of the Midland Machine Co., which has removed its plant and business from 813 West Jefferson Avenue, Detroit, to 1218 Hastings Street, Detroit, doubling the size of its former manufacturing plant.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on iron and steel articles, aside from wrought iron and steel pipe in carloads, per 100 lb., New York, 19.5c.; Philadelphia, 18.5c.; Boston, 21.5c.; Buffalo, 11.6c.; Cleveland, 13.5c.; Cincinnati, 18.5c.; Indianapolis, 20c; Chicago, 21.5c.; St. Louis, 27c.; Kansas City, 47c.; minimum carload, 36,000 lb.; St. Paul, 35.5c.; minimum carload, 36,000 lb.; Denver, 79c.; minimum carload, 36,000 lb.; Omaha, 47c.; minimum carload, 36,000 lb.; New Orleans, 30.7c.; Birmingham, 46c.; Pacific Coast, 75c.; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is 90c., minimum carload, 40,000 lb.; and 85c., minimum carload, 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 40c. per 100 lb., minimum carload 46,000 lb.; to Omaha 40c., minimum carload 46,000 lb.; to St. Paul 35.5c., minimum carload 46,000 lb.; Denver 79c., minimum carload 46,000 lb. *A 3 per cent transportation tax now applies.*

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees 3 in. and over, 3c.

Wire Products

Wire nails, $3.50 base per keg; galvanized, 1-in. and longer, including large-head barb roofing nails, taking an advance over this price of $2, and shorter than 1-in., $2.50. Bright basic wire, $3.35 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.25; galvanized wire, $3.95; galvanized barb wire, and fence staples, $4.35; painted barb wire, $3.65; polished fence staples, $3.65; cement-coated nails, $3.40 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 47 per cent off list for carload lots, 46 per cent for 1000-rod lots, and 45 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large rivets ..... $4.65 base
7.15 in x 6 in. smaller and shorter rivets..45-10 per cent off list
Machine bolts h.p. nuts, ⅜ in. x 4 in.
Smaller and shorter, rolled threads.....50-10 per cent off list
Cut threads ..... 50-5 per cent off list
Larger and longer sizes..... 40-10 per cent off list
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.
Smaller and shorter..... 40-10 per cent off list
Larger and longer..... 35-5 per cent off list
Carriage bolts, ⅜ in. x 5 in.
Smaller and shorter, rolled threads.....50-5 per cent off list
Cut threads ..... 40-10-5 per cent off list
Larger and longer sizes..... 40 per cent off list
Lag bolts ..... 50-10 per cent off list
Plow bolts, Nos. 1, 2, 3..... 50 per cent off list
Hot pressed nuts, sq. blank..... 2.50c. per lb. off list
Hot pressed nuts, hex., blank..... 2.30c. per lb. off list
Hot pressed nuts, sq., tapped..... 2.30c. per lb. off list
Hot pressed nuts, hex., tapped..... 2.10c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank..... 2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped....2.00c. per lb. off list
Semi-finished hex. nuts.
⅝ in. and larger..... 60-10-10 per cent off list
9/16 in. and smaller..... 70-5 per cent off list
Stove bolts ..... 70-10 per cent off list
Stove bolts ..... 2½ per cent extra for bulk
Tire bolts ..... 50-10-5 per cent off list

The above discounts are from present lists now in effect. All prices carry standard extras.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $57; chain rods, $65; screw, rivet and bolt rods and other rods of that character, $65. A tentative differential of $10 per ton over soft rods for high carbon rods has been agreed upon.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16 in. and larger, per 100 lb., $3.90. track bolts, $4.90. Boat spikes, $5.25 per 100 lb., f.o.b. Pittsburgh.

Terne Plate

Effective Nov. 7, prices on all sizes of terne plates are as follows: 8-lb. coating, 200 lb., $15 per package; 8-lb. coating, I. C., $15.30; 12-lb. coating, I. C., $16.75; 15-lb. coating, I. C., $17.75; 20-lb. coating, I. C., $19; 25-lb. coating, I. C., $20; 30-lb. coating, I. C., $21; 35-lb. coating, I. C., $22; 40-lb. coating, I. C., $23 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.90c. for delivery late this year, and 4.50c. to 5c. from warehouse in small lots for prompt shipment. Refined iron bars, 3.50c. in carload and larger lots, f.o.b. mill.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card, as announced Nov. 5 by the Government on steel pipe, those on iron pipe being the same as quoted for some time:

Butt Weld

Steel			Iron		
Inches.	Black	Galv.	Inches.	Black	Galv.
⅛, ¼ and ⅜	44	17½	⅛ and ¼	23	+4
½	48	33½	⅜	24	+3
¾ to 3	51	37½	½	28	10
			¾ to 1½	33	17

Lap Weld

2	44	31½	1¼	18	3
2½ to 6	47	34½	1½	25	11
7 to 12	44	30½	2	26	12
13 and 14	34½	..	2½ to 6	28	15
15	32	..	7 to 12	25	12

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	40	22½	⅛, ¼ and ⅜	22	5
½	45	32½	½	27	14
¾ to 1½	49	36½	¾ to 1½	33	18
2 to 3	50	37½			

Lap Weld, extra strong, plain ends

2	42	30½	1¼	19	4
2½ to 4	45	33½	½	25	11
4½ to 6	44	32½	2	27	14
7 to 8	40	26½	2½ to 4	29	17
9 to 12	35	21½	4½ to 6	28	16
			7 to 8	20	3
			9 to 12	15	3

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent. Prices for less than carloads are four (4) points lower basing (higher price) than the above discounts on black and 5½ points on galvanized.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh, announced Nov. 13, as agreed upon by manufacturers and the Government:

Lap Welded Steel		*Charcoal Iron*	
3½ to 4½ in.	34	3½ to 4½ in.	12½
2½ to 3¼ in.	24	3 to 3¼ in.	+ 5
2½ in.	17½	2½ to 2⅝ in.	+ 7½
1¾ to 2 in.	13	2 to 2½ in.	+22½
		1⅝ to 1⅞ in.	+35

Standard Commercial Seamless—Cold Drawn or Hot Rolled

	Per Net Ton		Per Net Ton
1 in.	$340	1¾ in.	$220
1⅛ in.	280	2 to 2½ in.	190
1¼ in.	270	2¾ to 3¾ in.	180
1½ in.	220	4 in.	200
		4½ to 5 in.	220

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

Sheets

Makers' prices for mill shipments on sheets of United States standard gage, in carload and larger lots, are as follows, 30 days net or 2 per cent discount in 10 days.

Blue Annealed—Bessemer	Cents per lb.
Nos. 3 to 5	4.20
Nos. 9 and 10	4.25
Nos. 11 and 12	4.30
Nos. 13 and 14	4.35
Nos. 15 and 16	4.45
Box Annealed, One Pass Cold Rolled—Bessemer	
Nos. 17 to 21	4.80
Nos. 22 and 24	4.85
Nos. 25 and 26	4.90
No. 27	4.95
No. 28	5.00
No. 29	5.10
No. 30	5.20
Galvanized Black Sheet Gage—Bessemer	
Nos. 10 and 11	5.25
Nos. 12 and 14	5.35
Nos. 15 and 16	5.50
Nos. 17 to 21	5.65
Nos. 22 and 24	5.80
Nos. 25 and 26	5.95
No. 27	6.10
No. 28	6.25
No. 29	6.50
No. 30	6.75
Tin-Mill Black Plate—Bessemer	
Nos. 15 and 16	4.80
Nos. 17 to 21	4.85
Nos. 22 to 24	4.90
Nos. 25 and 27	4.95
No. 28	5.00
No. 29	5.05
No. 30	5.05
Nos. 30½ and 31	5.10

PERSONAL

A. N. Martin has resigned as industrial agent of the Baltimore & Ohio Railroad, and on Jan. 1 will become general sales manager for the Fulflo Pump Co., Cincinnati, manufacturer of small centrifugal pumps for machine tools, grinding machines, automobile and aeroplane motors and air compressors.

James McNaughton has been elected president of the Eddystone Munitions Co., Eddystone, Pa., and Captain Walter Wilhelm vice-president. Charles J. Schlacks, general manager of the Remington Arms Co., has become chairman of the board of directors, retaining his position with the Remington Co.

Tampton Aubuchon, manager of the Louisville Industrial Foundation, will establish a bureau of the Louisville Industrial Foundation at Washington, and is assembling data from Louisville, Ky., manufacturers as to the Government contracts that they will be able to handle. Mr. Aubuchon will go to Washington about the first of the year to make arrangements for the plan.

Raymond G. Hutchinson, division engineer of the American Brass Co., Waterbury, Conn., has been appointed superintendent of the Buffalo plant of the company, formerly the Buffalo Copper & Brass Rolling Mill.

Frederick W. Nettleton, for the past eight years superintendent of the Waterbury Clock Co., Waterbury, Conn., has resigned to accept a position with the Bristol Brass Co., Bristol, Conn.

Charles H. Sparell, formerly secretary of the mercantile bureau of the Worcester Chamber of Commerce, has been made purchasing agent and traffic manager of the Spencer Wire Co., Worcester, Mass.

Stanley P. Stewart, mechanical engineer Stewart Boiler Works, Worcester, Mass., has been appointed assistant to the superintendent of the machinery division of the American International Shipbuilding Corporation, Philadelphia.

Joseph T. Martin, who has been connected with the Sparrows Point, Md., plant of the Bethlehem Steel Co. for about 24 years, has resigned to become general manager of the Hog Island Shipyards, Philadelphia, and has entered upon his new duties. Mr. Martin was superintendent of the plant at Sparrows Point. Before leaving he was tendered a banquet by his fellow workers and was presented a handsome grandfather's clock.

George Endicott, for the last two and one-half years mechanical engineer Morgan Spring Co., Worcester, Mass., has resigned to accept a position in the sales department of the Wickwire Steel Co., Buffalo. He will make his headquarters at Buffalo and assume his new duties Jan. 1.

W. H. Harman, who has been vice-president and general sales manager of the Southwark Foundry & Machine Co., Philadelphia, was elected recently president of the company to fill the vacancy caused by the election of Robert Radford to the chairmanship of the board of directors.

C. M. Carmichael, formerly assistant works manager in charge of the electric furnace department of the Anniston Steel Co., Anniston, Ala., and later with the British Forgings, Ltd., Toronto, Ont., as superintendent of the steel plant, has accepted the position of assistant works manager, Electro Metals Co., Welland, Ont.

J. C. Broadnax, who was connected with the electric furnace department of the Anniston Steel Co., Anniston, Ala., and more recently with the British Forgings, Ltd., Toronto, Ont., as assistant superintendent of the steel plant, has been appointed superintendent of the electric furnace department at the Watertown Arsenal, Watertown, Mass.

William A. Battey, who resigned as Eastern sales manager of the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., is succeeded by William C. Briggs, who for the past ten years was associated with him in the New York office as sales engineer. Robert T. Turner has joined the New York office sales force as export manager and sales engineer. He was connected with the export sales department of the Niles-Bement-Pond Co., New York. Mr. Battey has been vice-president of the Pennsylvania Crusher Co., Philadelphia, for some time, and found it necessary to devote his entire time to that company, which manufactures pulverizers, breakers and special crushing machinery for the by-product coke and other industries requiring reduction apparatus.

H. T. Whigham, representative of the United States Steel Products Co., in London, England, arrived in this country recently, and will remain until about Jan. 15, when he will sail for England again. Mr. Whigham makes a trip to the United States every year for the purpose of discussing business plans and policies with his company. He is a brother of William Whigham, vice-president and chief engineer of the Carnegie Steel Co., Pittsburgh.

Clarence H. Beach recently resigned from the sales department of the Midvale Steel & Ordnance Co. as sales engineer, and has accepted a position as district sales manager for the Central Steel Co., Massillon, Ohio, with offices in Chicago.

E. F. Lake, metallurgical engineer, formerly located in Detroit, Mich., has moved to 557 East Fiftieth Place, Chicago, and taken the position of assistant superintendent of the Rich Tool Co. The company is manufacturing one-piece valves from high-speed steel for airplane and automobile engines, and valves of high chromium steel similar to the so-called stainless steel.

Col. Millard F. Hunsiker, formerly of the Carnegie Steel Co., who has lived in London for nearly 20 years, arrived at an Atlantic port in this country Dec. 23. Col. Hunsiker was the projector of the Officers' Club in London, which for the past two months has been welcoming American officers arriving in England.

OBITUARY

CHARLES J. KLEIN, designing engineer, Cutler-Hammer Mfg. Co., Milwaukee, manufacturer of electric controlling devices, died suddenly of apoplexy in his apartment last week. He was 55 years of age and a native of New York. Mr. Klein went to the main plant in Milwaukee in 1908 after being associated with the New York plant for several years. He was closely identified with the perfection of all of the many inventions of controlling devices manufactured by the Cutler-Hammer company.

Cleveland Crane Annual Bonus Plan

As has been the custom for the past eight years, employees of the Cleveland Crane & Engineering Co., Wickliffe, Ohio, received checks from the company representing a share of the profits of the year distributed as a bonus for faithful service. This system is figured on the percentage basis. Three thousand hours have been taken as a year's work, and to each employee who has not been abent from work more than one day each month during the year 2 per cent of his yearly wages has been paid for each full year that he has been in the employ of the company. A man who has been with the company for the past eight years received 16 per cent of his yearly wages. Fifty per cent of all the employees received checks this year. A great number of the old employees' checks represent 20 per cent of their wages for this year.

The International Arms & Fuze Co., Inc., Bloomfield, N. J., is now employing about 25 girls for lathe work at its plant. The company is said to be planning to increase this number as soon as suitable female employees can be obtained.

IRON AND INDUSTRIAL STOCKS

Continued Liquidation Depresses the Market to Still Lower Levels

Values of stocks have fallen off still further. Industrials, while sharing in the continued drop, are much less affected than rails, and in a partial recovery that set in the latter part of the week they led in the upward tendency. For the most part, however, closing values Saturday were below the previous week's. It becomes increasingly difficult to fix the relation between prices and the values which they represent, each twist in the fortunes of war bringing its separate influence to further complicate the market.

The range of prices on active iron and industrial stocks from Tuesday of last week to Tuesday of this week was as follows:

Allis-Chalm. com.	15 - 17	Int. Har. Corp. com.	50½ - 51½
Allis-Chalmers pf.	68	Lackaw. Steel	71¾ - 74½
Am. Can com.	33 - 35	Lake Supr. Corp.	10¼ - 11
Am. Can pf.	87 - 88	Midvale Steel	39½ 42½
Am. Car & Fdry. com.	60½ - 64¼	Nat.-Acme	25¼ - 26¼
Am. Car & Fdry. pf.	101 -102	Nat. Enam. & Stm. com.	34 - 35¾
Am. Loco. com.	46⅝ - 50⅞	N. Y. Air Brake.	104 -116
Am. Radiator com.	250	Nova Scotia Steel	59 - 65
Am. Ship com.	89 - 90	Pressed Sl. com.	49 - 54
Am. Steel Fdries.	51 - 55½	Pressed Steel pf.	95
Bald. Loco. com.	51½ - 57⅜	Ry. Steel Spring com.	40 - 41½
Bald. Loco. pf.	93	Ry. Steel Spring pf.	88½
Beth. Steel com.	66¼ - 71⅜	Republic com.	70½ - 74⅞
Beth. Sl. Class B	66½ - 71¾	Republic pf.	89 - 90½
Beth. Steel pf.	94 - 95	Sloss com.	33½ - 35
Case (J. I.) pf.	75	Superior Steel	33 - 36⅜
Cent. Fdry. com.	25⅛ - 26	Transue-Williams	39
Cent. Fdry. pf.	35 - 38	Un. Alloy Steel 1st pf.	34½ - 35½
Chic. Pneu. Tool.	40 - 41	U. S. Pipe com.	10
Colo. Fuel	30¾ - 34	U. S. Pipe pf.	42½
Cruc. Steel com.	45¾ - 50¾	U. S. Steel com.	79½ - 85¾
Cruc. Steel pf.	83 - 84¾	U. S. Steel pf.	102¾ - 104⅞
Deere & Co. pf.	93	Va. I. C. & Coke.	47 - 48
Gen. Electric	118¾ - 124⅝	Westingh. Elec.	34 - 36¼
Gt. No. Ore. Cert.	23¼ - 24¾		
Gulf States Steel.	85		
Int. Har. of N. J. com.	105 -110¼		

Industrial Finance

The American Screw Co., quarterly, 1¾ per cent, extra 5 per cent and supplementary 4 per cent, all payable Dec. 31.

The American Shipbuilding Co., 1¾ per cent and extra 2½ per cent on the common, and quarterly 1¾ per cent on the preferred, payable Feb. 1.

The Babcock & Wilcox Co., quarterly, 2 per cent, payable Jan. 3.

The Billings & Spencer Co., quarterly, 2 per cent and extra 3 per cent, payable Jan. 2.

The E. W. Bliss Co., quarterly, 1¼ per cent and extra 11¼ per cent on the common and quarterly 2 per cent on the preferred, payable Dec. 31.

The Brier Hill Steel Co., quarterly, 1½ per cent and extra 3½ per cent on the common, and quarterly 1¾ per cent on the preferred, payable Jan. 1.

The Canadian Crocker-Wheeler Co., quarterly, 1¾ per cent and bonus of 3 per cent on the preferred, and quarterly 1¾ per cent on the preferred, payable Dec. 31.

The Carbon Steel Co., quarterly, 2 per cent and extra 2 per cent on the common, payable Dec. 22, 4 per cent on the first preferred, payable in March and 6 per cent on the second preferred, payable in July.

The Colorado Fuel & Iron Co., quarterly, ¾ per cent on the common, payable Jan. 25.

The Colt's Patent Fire Arms Mfg. Co., quarterly, $3, payable in January.

The Fairbanks, Morse Co., quarterly, 3 per cent on the common, payable Dec. 31.

The Howe Scale Co., quarterly, 1 per cent on the common and 1¾ per cent on the preferred, payable Jan. 2.

The Ingersoll-Rand Co., 10 per cent, payable Dec. 28.

Manning, Maxwell & Moore, Inc., quarterly, 1½ per cent, payable Jan. 2.

The Nova Scotia Steel & Coal Co., quarterly, 2½ per cent on the common and 2 per cent on the preferred, payable Jan. 15.

The Ohio Iron & Steel Co., extra 20 per cent, payable Jan. 1.

The Otis Elevator Co., quarterly, 1¼ per cent on the common and 1½ per cent on the preferred, payable Jan. 15.

The Standard Coupler Co., 4 per cent on the preferred, payable Dec. 24.

The Superior Steel Co., quarterly, 1½ per cent on the common, payable Feb. 1.

The Transue & Williams Steel Forging Co., quarterly, $1.25, payable Jan. 10.

The Trumbull Steel Co., quarterly, 1½ per cent and extra 4 per cent on the common, and 1¾ per cent on the preferred, payable Jan. 1.

American Brake Shoe & Foundry Co. Report

Contracts have been placed with the American Brake Shoe & Foundry Co. by the United States Government for machining 750,000 howitzer shells of 155 millimeter caliber, according to the annual report. The Government is to furnish the forgings, and the company is now remodeling its shell plant to enable it to execute the order. Net income of the company in the year ended Sept. 30 last amounted to $3,232,242, an increase of $1,604,935 over the year before. The foundry business of the corporation was greater than ever before, both in tonnage and the value of shipments. The actual profits were, however, not as large as those of the previous year, owing to the great advance in the cost of raw material and labor. Profits from the machining of shells for the British Government helped to increase the total income. In all, the company delivered 570,000 shells to Great Britain.

William G. Pearce, president of the company, in his remarks to the stockholders, tells how the company took up war contract work for the United States Government as follows:

"Early in February, 1917, we offered the output of our shell plants at Erie, Pa., to the United States Government on such terms as the Government itself on examination should consider proper. Thereafter negotiations were carried on with the representatives of the Government, and on Aug. 24, 1917, a contract was made for 3000 155-mm. howitzers. In accordance with the terms of the contract, a plant was to be erected by us at Erie, Pa., adjoining our shell plants. The building is at this date practically completed and much of the machinery is already in place. The Government is to furnish the principal forgings, and the company is to supply the remaining material and machine and assemble the howitzers.

"On Oct. 30, 1917, an order was given the company by the United States Government for machining 750,000 155-mm. howitzer shells. The Government is to furnish the forgings, copper bands and base covers. The company is now remodeling its shell plant to enable it to execute this order.

"The contracts referred to are in the form known as cost plus fixed profit. At their termination the Government has the right to remove at its expense all increased facilities which the Government has paid for in connection with the howitzer contract, and such additional equipment as it has paid for in connection with the shell contract."

Industrial Finance

Stockholders of the Liberty Steel Co., Warren, Ohio, have approved a proposed increase of $150,000 in common stock, making an authorized capital stock of $650,000 in common and $250,000 in preferred. A bond issue of $150,000 to be underwritten by Warren banks has also been authorized.

The Madison County Trust Co. has been appointed receiver for the Spring Steel Fence & Wire Co., Anderson, Ind. The company had $160,000 capital stock. On account of inability to obtain wire for fence making, the plant was able to operate only at intervals.

In order to take care of its increased business in automobile wheels, the National Wire Wheel Works, Inc., Geneva, N. Y., has recently increased its capital from $350,000 to $1,000,000. Additional buildings will be erected and the capacity of the plant will be increased to 2000 wheels per day.

The Wickwire Steel Co., River Road, Buffalo, has increased its capital from $3,000,000 to $8,000,000.

The Indiana Steel Co., Gary, Ind., has filed notice of increase in its capital from $20,000,000 to $50,000,000.

The Bethlehem Steel Corporation, in its statement submitted to the New York Stock Exchange, reports net earnings of $43,524,804 for the ten months ended Oct. 31, as compared with $61,717,309 for the calendar year 1916, and $24,821,408 for 1915.

Judge Gary Announces Additional Prices

(*Continued from page* 1543)

chromium and 0.18 per cent vanadium is specified, add 4c. per lb.

Titanium Steel: When titanium is specified, add 1.50c. per lb.

Rolling Mill Steel Castings

The following prices for rolling mill castings are subject to discounts shown below:

0.25c. per lb. under 750 tons per year, 0.45c. per lb. 750-2000 tons per year, 0.65c. per lb. 2000-7500 tons per year, 0.75c. per lb. over 7500 tons per year; except that annealing boxes and annealing bottoms, charging boxes and charging box heads and ends are subject to a discount of only 0.25c. per lb. when total requirements amount to less than 7500 tons, and only 0.35c. per lb. when total requirements amount to more than 7500 tons.

Rolls, Unfinished: $7.70 to $11.80 per 100 lb., depending on weight of castings required.

Usual extras to be added for carbon over 0.50 and other alloys.

Pinions, Unfinished: $8.05 to $13.55 per 100 lb., depending on weight of castings required.

Usual extras to be added for carbon over 0.50 and other alloys.

Annealing Boxes and Pots: $8.35 to $10.40 per 100 lb., depending on thickness.

Add: ¼c. per lb. when steam test is specified.

Annealing Bottoms: $6.80 to $7.60 per 100 lb., depending on inside length.

Charging Boxes: $7.45 per 100 lb.

Charging Box Heads and Ends: $8.60 to $9.65 per 100 lb., depending on weight, quantity and amount of core work.

Rolling Mill and Steel Works Miscellaneous, Not Otherwise Specified

$7.70 to $20 per 100 lb., depending on weight and intricacy of design.

Add 20 per cent to these prices for hollow and disk table rollers and cylinders.

Add 1c. per lb. for all castings with water circulating pipes.

Add ¼c. per lb. if carbon over 0.40 is specified.

Add for alloys, the usual extras.

Coupling Boxes, Spindles, Roll Housings, Pinion Housings and Anvil Blocks

$7.35 to $20.05 per 100 lb., depending on weight of castings required.

Gears, Gear Blanks, Gear Segments, Racks, Worms, Worm Wheels, Sprockets, Sheaves and Pulleys

$8.30 to $30.45 per 100 lb., depending on weight of castings required and intricacy of design.

Add ½c. per lb. when over 0.40 carbon is specified or when chemical or physical test is required.

Railroad motor gears and machine molded gears not covered by these prices.

For alloys, add usual extras.

Bells, Hoppers, Hopper Extensions, Lip Rings, Tuyere Jackets, Hot Metal or Slag Pots and Rings

$8.55 per 100 lb.

Valve Bodies, Tuyere Stocks, Pipes, Nozzles and Saddles

$9.35 to $12.10 per 100 lb., depending on weight of castings required.

Hearth Jackets or Bosh Plates

$7.65 to $7.70 per 100 lb., depending on weight of castings required.

Miscellaneous Blast Furnace Castings

$7.70 to $20 per 100 lb., depending on weight of castings required.

Add 1c. per lb. for all castings with water circulating pipes.

Add ¼c. per lb. if carbon over 0.40 is specified.

Add for alloys, the usual extras.

The foregoing schedules cover the castings named therein, in the rough, f.o.b. makers' works, with published freight rate allowed to freight station of purchaser to all points in the United States within a line drawn from Boston, through Schenectady, Rochester and Niagara Falls, N. Y., Detroit, Duluth, Minn., St. Louis, Cincinnati, Washington, Cape May, N. J., and all Atlantic Ocean terminal points between Cape May and Boston. When delivery is made outside of boundary line freight is allowed only to boundary line.

Body and Truck Bolsters of Ordinary Design for Freight Cars

$87.50 to $176 per car set, depending on weight of each and quantity ordered.

Tender Truck Bolsters of Ordinary Design

$9.50 per 100 lb.

Truck Side Frames for Freight Cars

$118.50 to $218 per car set, depending on weight each and quantity ordered.

Tender Truck Side Frames

$51 to $71 per frame when of ordinary design and without special features.

These prices on bolsters and side frames cover the integral casting only, without any detachable parts and without any drilling or machine work. An extra charge will be made for patterns when less than 100 castings are ordered from any one pattern.

These prices cover delivery f.o.b. cars at works of manufacturer with freight allowed, at carload rate, to point on railroad line nearest the manufacturer's foundry or to any car or locomotive building plant located north of the Ohio River, east of the Mississippi River and west of the Hudson River, including Bettendorf, Iowa, St. Louis and St. Charles, Mo., Huntington, W. Va., and Curtis Bay, Md.

Couplers

The price of M. C. B. standard type top operating freight car couplers, without uncoupling chains, 5 in. x 5 in. shanks, with 6½ in. butt ends, will be $38.25 per pair; 5 in. x 7 in. shanks, with 6½ in. butt ends, $39.05 per pair; with proportionately increased price for larger sizes and extra parts.

The price of the M. C. B. type "D" coupler of regular dimensions, shanks, not more than 21¼ in. long, fitted with 9 in. face, knuckles and without chains, 6 in. x 8 in. shanks, with 6½ in. butt ends, will be $51 per pair; for 5 in. x 7 in. shanks, with 6½ in. butt ends, $50.20 per pair; with proportionately increased prices for other dimensions and extra parts.

The price of passenger car couplers of old M. C. B. standard type, measuring not more than 4 ft. from pulling face of knuckle, when closed, to end of shank, 9 in. face knuckles, will be $28.50 each, with proportionately increased prices for other dimensions and extra parts.

Short shank, swing head locomotive couplers and special tender couplers, old M. C. B. standard type, fitted with 11 in. face knuckles and without uncoupling chains, $23.80 each; new M. C. B. standard type "D" short shank, swing head locomotive couplers and special tender couplers, fitted with 11 in. face knuckles and without uncoupling chains, $31.30 each; with proportionately increased prices for special designs and extra parts.

These prices cover delivery f.o.b. cars at works of manufacturer with freight allowed, at carload rate, to point on railroad line nearest manufacturer's coupler foundry, or to any car or locomotive building plant located north of the Ohio River, east of the Mississippi River, and west of the Hudson River, including Bettendorf, Iowa, St. Louis and St. Charles, Mo., Huntington, W. Va., and Curtis Bay, Md. If the freight rate is advanced during the period in which these prices are effective, the amount of such advance will be added to the prices as given.

ALL THE ABOVE PRICES APPLY ONLY TO STEEL CASTINGS OF THE GENERAL TYPE, DESIGN OR SPECIFICATION MENTIONED. PRICES FOR SPECIAL DESIGNS OR SPECIFICATIONS WILL BE SUBJECT TO NEGOTIATION.

Standard Steel Cut Nails

Base—20d to 60d per 100 lb., f.o.b. Pittsburgh, $4.

Extras as follows:

	Extra
Common, Fence and Sheathing	
20d to 60d	Base
10d to 16d	$.05
8d and 9d	.10
6d and 7d	.20
4d and 5d	.30
3d	.45
2d	.75
Casing, Box, Flooring and Finishing	
10d and larger	.15
8d and 9d	.25
6d and 7d	.35
4d and 5d	.50
3d	.70
2d	1.00
Fine Finishing	
3 in. and larger	.25
2½ in. and 2¾ in.	.35
2 in. and 2¼ in.	.45
1¾ in.	.65
1½ in.	.65
1¼ in.	.85
1 in.	1.15
Fine Nails	
4d	.50
3d	.75
2d	1.00
3d Light	1.25
Cut Spikes	
All sizes	.10
Light Barrel and Lining	
1 in.	.85
⅞ in.	1.00
¾ in.	1.20
Common Barrel and Roofing	
1½ in.	.30
1⅜ in.	.40
1¼ in.	.50
1⅛ in.	.60
1 in.	.70
⅞ in.	.85
¾ in.	1.00
Slating	
6d	.30
4d and 5d	.40
3d	.60
2d	.80
Clinch and Boat	
3 in. and larger	.45
2½ in. and 2¾ in.	.55
2 in. and 2¼ in.	.65
1½ in. and 1¾ in.	.75
1¼ in.	.95
1 in.	1.15
⅞ in.	1.30
¾ in.	1.45
Cooper	
10d	.05
8d	.10
6d and 7d	.20
4d and 5d	.30
3d	.50

Tin and galvanized nails subject to special negotiation.

AS SECRETARY DANIELS VIEWS IT

He Says Great Progress Has Been Made in Spite of Delays

WASHINGTON, Dec. 24.—That naval preparedness has reached a very satisfactory status was the encouraging statement made by Secretary Daniels at the initial meeting of the House Committee on Naval Affairs, instructed to investigate the administration of the Navy in the conduct of the war. The Secretary does not claim that the advance has been steady or that as much has been accomplished as could be desired, but that upon the whole the results will be very gratifying to the country at large. The detailed progress made as described in the Secretary's statement to the committee will be of special interest to all manufacturers engaged in the production of war supplies.

"At the beginning of this conflict," said Secretary Daniels, "two potent weapons of war sprang suddenly into being, the airplane and the submarine. There were no provisions in the military textbooks of a dozen years ago for either. There were no facilities in this country for their construction in any considerable numbers, nor any well-defined tactics for defense against their attacks.

"It is gratifying to recall that the first forces of the United States to land in France for service against the enemy were the United States naval aeronautic detachments, and that the first naval ships of our country to be engaged in active war duty were the patrol boats guarding against possible submarine attack on our own coast, and our destroyers effectively searching and sinking German submarines off the shores of Europe.

"That our great ships of war and their auxiliaries should be found ready in time of need for any possible duty under old methods of warfare was something which the country had a right to expect as a matter of course. That we should be ready with such speed to meet the new conditions of warfare with such promptness and such efficiency is, I think, a matter of some congratulation.

Aeronautic Progress Slow

"In previous reports to Congress I have expressed very frankly my belief that our aeronautic progress was not satisfactory. As a new branch of naval activity using a new war machine for a new purpose, this was not to be wondered at. I was glad to report this year that the Aviation Division had made gratifying strides. In this, as in all other matters of supplies for the Navy, we have been hampered by a lack of manufacturing facilities even for our own needs. To this has been added the necessity of providing an enormous development in aviation lines for the Army. Continuing the policy of being, so far as possible, self-sustaining, we have erected our own airplane manufactory at Philadelphia. Within 90 days of the beginning of the work on the buildings, the keel of the first naval flying boat was laid. At this factory, in addition to relieving other manufacturers for Army work, we hope to be able to conduct experimental developments without clogging the wheels of production, and from a business point of view the figures that we will obtain as to costs of airplane construction will go far toward solving many difficult problems of the adjustment of prices of articles of which there have been up to very recently so few manufactured.

"The problem of patrol boats for our own coast was another novel and perplexing question. The use of many small boats, some of them less than 100 feet over all, as actually important vessels of war was not contemplated up to a very short time ago. The possibility of their creation as an organized force has been a very recent addition to naval strategy. A hurried survey of the situation revealed that there were not enough suitable private craft to meet the demands of the situation and we were forced at the very first prospect of actual hostilities, and before war was declared, to undertake the construction of hundreds of small boats. All up and down our coast small-craft shipyards have been busy with this work. Our own navy yards are taking care of all that they could possibly find room for, and while not all of these craft have gone forward with the speed to be desired, we feel that this situation has been met with all the expedition that it was possible to use.

Increase in Ships

"We now have over 1000 ships, as against 300 in commission two years ago.

"To man these ships required an increase in personnel. I hope you will learn in detail of the splendid work of our recruiting bureaus, which indeed in the early stages of the war were almost oversuccessful in that we received men so rapidly as to make even temporary arrangements for their accommodation an exceedingly puzzling matter. We have expanded tremendously our naval stations and increased the number.

"To put a fleet into being requires ships, guns, ammunition, men, and provisions for the men. Our own mercantile marine, unfortunately, unlike that of Great Britain, was not large enough to have created for its own purposes these enormous shipbuilding facilities which have made this particular problem comparatively easy for our allies. In fact, the shipbuilding resources of our country were so small as to make the carrying out of our new naval program impossible without additions to the private yards as well as to our navy yards themselves. From this you will understand the difficulties of enormously adding to this construction and at the same time affording every possible facility for the building of cargo-carrying vessels in undreamed of quantities.

"When new requirements of naval warfare made evident the necessity of building a very large number of additional destroyers, there was literally not a vacant ways to hold them in the country. Speed was everything, as indeed speed is to-day the greatest necessity of the war. Not only were there no ways for the ships, and in many cases no ground in the shipyards to build such ways, but there were not, to take one single instance, enough forge plants in the United States to forge their shafts and propelling machinery, without suspending the arming of our troops. You will learn later on more in detail as to how this problem has been met, of how keels are being laid to-day on ground that was a swamp land a few months ago, of how the finishing touches are being put on extensions to forge plants, which in some cases are as large or larger than the original plants themselves, of how every manufacturer who could make anything needed for a destroyer, always keeping in mind the imperative immediate needs of our sister military branch, has been set to work on this task.

Delays Are Admitted

"Of course, not everything has run with perfect smoothness; there have been delays. You cannot make a tremendous demand of this kind on a comparatively small industry without upsetting many things, without completely disorganizing the usual peaceful routine of business. It has not always been easy to get the necessity for speed, speed, speed into the heads of the contractors, but, on the whole, we think that we have done well. We hope that you will agree with us.

"New methods of contracting have been demanded and, fortunately, Congress in its wisdom gave the necessary latitude to speed up construction. For early construction ashore and to hasten construction of ships, it has been necessary in some instances to make contracts on a cost plus 10 per cent basis. Frankly, I do not like such contracts and never make them where it is possible to do otherwise. Of 496 contracts for work on shore, only 62 were on the percentage basis.

"This method is not perfect, nor has it been entirely satisfactory. There are many involved problems in cost accounting, and there will doubtless be many questions to be settled when the final bills are paid, but it has been our judgment that it was the only way to start immediate construction in emergencies which confronted

us. By this plan, shipbuilders are insured against financial loss, and the Government is assured against abnormal profits which would have to be added to the already heavy burdens which the war has placed upon every taxpayer of our country.

"To expand many private plants to more than double their original capacity is an order easy to give. For the manufacturer to find in war time the immediate capital necessary for this development has proved a hard matter. Congress has recognized this by a wise provision permitting us to advance the funds for this expansion work. We have tried to use this power most conservatively, but we have not hesitated to use it when it was the only way to get quick results. In no case, however, do I think you will find that such funds have been advanced without perfect security that the Government will eventually get its money's worth. Bonds have been required or the title to the machinery paid for with these funds has been retained by the Government until repayment is made."

Organizing Industries for War Work

The Merchants and Manufacturers' Association, Baltimore, Md., through its committee on manufactures, has started an organization of large and small plants, with the view of helping all of them in war work. It is pointed out by the committee that because of trade conditions the manufacturers should organize along well-defined lines. All factories, large and small, have been requested to send the following information to the association:

1. What the factory is making now.
2. Capacity of plant—that is, volume of output.
3. Suggestions as to what factory can make—other than to the normal product—in the form of complete commodities or as a "part" of some commodity manufactured in another plant.
4. Lines of work to which labor is adaptable by virtue of the skill and experience required in present factory.
5. Average number of employees in factory; capacity for quick deliveries.
6. Size of buildings and details as to machinery in factory.
7. Nature of raw material now in use.
8. Is raw material easily and quickly obtained?
9. Number of years in business.
10. Present capital of plant.

The committee says that it is more than likely that the Government, in the future awarding of war contracts, will deal with industries as a whole, rather than with industries considered locally or individually. For this reason, it is stated, it will be wise for the factories to organize themselves in industrial groups in order to be prepared to meet the new policy on the part of the Government.

It is further pointed out that small concerns should participate in the organization because they may secure contracts for the manufacture of parts which otherwise would be unobtainable.

"The Government, for war reasons," says a notice sent out by the committee, "is certain to enforce a system of priorities in the matter of fuel and raw material, which system is likely to place small factories at a disadvantage if they are not engaged directly in the fabrication of some specific 'war items.'"

The Austin Co., Cleveland, has recently taken the following additional contracts for industrial buildings: One story and basement building, 200 x 260 ft., for the Selden Motor Co., Rochester, N. Y., for the manufacture of trucks; $200,000 Government arsenal, 200 x 400 ft., at Fortieth and Butler streets, Pittsburgh, Pa.; four-story reinforced concrete structure, 80 x 140 ft., for the Liggett & Myers Tobacco Co., Huntington, W. Va., and a shipping building, 52 x 183 ft., for the Brown Hoisting Machinery Co., Cleveland. This company has just completed a building 100 x 117 ft., for the Dow Chemical Co., Midland, Mich., and is erecting the steel work for another building for the same company.

MANGANESE ORE IN 1917

Domestic Output May Reach 200,000 Tons in 1918—Low Grade Ore in Blast Furnaces

WASHINGTON, Dec. 24.—The great practical importance of the domestic output of manganese is now such that the U. S. Geological Survey is collecting statistics every three months. In a bulletin just issued it is stated that the canvass for the quarter ending October 31 has just been completed and shows a large increase in the number of shippers, as well as in the shipments of ore of each grade over those of the first six months of the year, which were slightly larger than those of the entire year 1916.

In 1916 only 26,996 gross tons of manganese ore was shipped by 55 operators, but in the first nine months of the present year 70,225 tons was shipped by 88 operators. The reports received by the Survey indicate that the shipments for the year will be about 122,275 tons, which will be nearly four times those for any preceding year. In September the production of high-grade ore was about 14,000 tons, and in November it was nearly 17,000 tons. The results of the inquiries made in most of the fields by the Survey indicate that the shipments in 1918 will be between 175,000 and 200,000 tons, sufficient to supply nearly one-third of the present demand of the steel industry. For about every 20,000 tons that can be produced in excess of the present domestic output it will be possible to release one ship that is now bringing ore from Brazil.

Manganiferous Ore for Spiegeleisen

Of manganiferous ores containing 15 to 40 per cent of manganese, 380,169 tons was shipped during the first nine months of 1917 by 58 operators against 176,130 tons shipped by 41 operators in the entire year of 1916. Most of this ore was used to make spiegeleisen. Of ores containing 5 to 15 per cent of manganese, 424,438 tons was shipped by 14 operators during the first nine months of 1917, against 372,673 tons shipped by 26 operators during the year 1916. A part of this ore was used to make spiegeleisen, and the remainder was smelted with iron ore to make high-manganese pig iron. The number of shippers given above does not include those of the Leadville district, Colo.

The great increase in the shipments of high-grade ore from Western States is noteworthy, particularly from Montana, Arizona, California, Utah, and Nevada. The prices now offered are causing prospectors in these States to search closely for ores, and many western mines are now shipping manganese ore that was left undisturbed in explorations made years ago. The Philipsburg district, in Montana, shipped about 7000 tons of high-grade ore during each month of the third quarter of 1917, and the Tombstone and Bisbee districts, in Arizona, are shipping large quantities of such ore. The rate of production of Virginia and Tennessee is increasing, but that of Arkansas and Georgia is not much larger than in 1916.

As recently as 1915 there was only a small market for ores containing less than 40 per cent of manganese, so that the large increase in shipments of low-grade ore during 1917 is striking. The production of these ores now appears to be limited more by the market than by the capacity of the mines.

The British Government has cancelled its contract with the New England Westinghouse Co., Springfield and Chicopee Falls, Mass., for 1,800,000 Moissen-Nagent rifles for Russia, due to the present unsettled conditions in Russia. The contract was about half filled. Officials have stated that negotiations are pending with the United States Government for a contract to make the new Browning machine gun, and officials are confident that an early order will be secured so that the working forces of the plants at Chicopee Falls and East Springfield will not disintegrate. The present force will be employed for some time longer completing Russian rifles now in process.

Machinery Markets and News of the Works

WAR BUYING STILL ACTIVE

Detroit Center of Latest Developments

Opinion Prevails Among Machine-Tool Men That Large Demands Will Come After First of New Year

With new machine-tool demand in the East quieter than for some months, the center of activity is now around Detroit and Cleveland, where many Government contracts are being placed. New England manufacturers are also coming into the market again for tools for Government work. A pronounced feature of the present situation is the number of so-called non-essential industries which are taking on war orders, automobile manufacturers, in particular, being called upon for various products, principally shells and airplane engines.

Machine-tool men believe that the present inquiry in Washington by the United States Senate will develop more efficient methods in Government departments, with the closing up of many war contracts now pending. It is expected that another avalanche of large lists for machine tools will come after the first of the new year. Machine-tool builders are wondering where all the tools are to come from. Deliveries on all tools needed for war work are in the worst condition yet known.

In the New York market there was no great activity last week, as compared with what the trade has been accustomed to expect in these times. A list of about 70 tools wanted for export to a munitions plant in France was issued by the Framerican Industrial Development Corporation, 44 Whitehall Street, New York. The International Arms & Fuze Co., Inc., Bloomfield, N. J., has taken a Government contract for detonators. The Watervliet Arsenal continues to buy. The Government is expected to buy soon for the General Vehicle Co. plant at Long Island City, which it recently purchased for an experimental station.

The Liberty Steel Products Co., Woolworth Building, will buy plate and angle shop equipment for the Foundation Co.'s shipyard. The Southern Shipbuilding Co., 17 Battery Place, will buy soon for its new shipyard at Charleston, S. C. The Chickasaw Shipbuilding Co., a subsidiary of the United States Steel Corporation, will buy equipment soon for its shipyard near Mobile, Ala. All of the fabricating for this plant will be done at Birmingham.

The magnitude of our war preparations is illustrated by the activity at the new Hammond, Ind., plant of the Standard Steel Car Co., where a hotel and 150 houses will be built to house workmen. This company has issued large lists of tools to be bought for making howitzer mounts. Orders will be placed largely in the East. It is understood this company's contract totals $60,000,000. Another large list will be issued by the Rock Island Arsenal if certain changes are made in recoil mechanisms for large guns. The newer design would require a number of arc-planing machines.

Several large war contracts have been placed with New England manufacturers. The S. A. Woods Machine Co., Boston, will make 2,000,000 trench mortar bombs and has purchased 40 turret lathes and several drilling machines. The American Steam Gauge & Valve Mfg. Co., Boston, has a contract for 2,000,000 detonators. The Amesbury Brass & Foundry Co., Amesbury, Mass., has Government contracts and is expected to buy tools. New England manufacturers of textile machinery are being urged to accept war contracts. The Howard & Bullough American Machine Co., Ltd., with plant at Pawtucket, R. I., will, it is reported, manufacture gun mounts. Other companies similarly equipped are expected to undertake war work and thus be rated as essential industries.

The Morgan Engineering Co., Alliance, Ohio, appears as the largest buyer of machine tools in the Cleveland market. Its list calls for about 200 lathes and other machines for work on a gun carriage order. The Templars Motor Corporation, Cleveland, is still buying equipment for machining 150,000 6-in. shells. A Canton, Ohio, company is in the market for 12 drilling machines.

Detroit is now the center of an important war activity. Motor companies, having decided to curtail automobile production, are quick to take up munition contracts. The newly organized Detroit Shell Co., with a capitalization of $2,000,000, has received shell contracts aggregating $30,000,000 and is soon to decide on a plant for manufacturing. Considerable new equipment will probably be purchased. The General Motors Corporation has taken a contract for 5000 Liberty motors, and this work will be distributed among the Cadillac, Northway, Buick and Chevrolet plants. The Harroun Motor Co., Detroit, has taken a large contract for 6-in. shells.

Prominent manufacturers of Cincinnati are co-operating in a plan to establish a large munitions plant in that city. Definite action is expected after the holidays. A tentative option has been taken on a plant now in operation.

New York

NEW YORK, Dec. 24.

A little better inquiry for small lots of machine tools was noted by dealers and factory representatives last week than during the preceding week. Large lists are scarce, though there are rumors in the market of impending inquiries which will reach good-sized proportions.

The opinion was expressed that the United States Senate inquiry into affairs in the War Department, Navy Department and Shipping Board will stir up increased activity, which should be reflected soon after the first of the new year in a renewal of large inquiries. The testimony of General Crozier that the Ordnance Department is still trying to place many large contracts was pointed to as an indication that machine-tool builders will have to meet another avalanche of orders within the near future.

There is a little more buying activity among shipbuilders. The Liberty Steel Products Co., Woolworth Building, New York, is in the market for plate and angle shop equipment for the Foundation Co. The list is not a large one. The Southern Shipbuilding Co., largely owned by Whittlesey & Whittlesey, 17 Battery Place, New York, will buy equipment shortly for its new plant at Charleston, S. C. The Chickasaw Shipbuilding Co., a subsidiary of the United States Steel Corporation, will soon begin to equip its plant near Mobile, Ala. All of the fabricating for this yard will be done at Birmingham, Ala., by the Tennessee Coal, Iron & Railroad Co.

The Watervliet Arsenal continues to buy, having closed last week for 18 grinders. It is expected in the trade that the Government will soon begin to buy for the General Vehicle Co. plant at Long Island City, which it recently purchased.

The Framerican Industrial Development Corporation, 44 Whitehall Street, New York, has issued a list of tools needed for a munition plant in France. About 70 tools, mostly milling machines, are wanted. The International Arms & Fuze Co., Inc., Bloomfield, N. J., has taken a detonator contract.

Machine-tool builders are giving almost their whole at-

tention to production and shipment as orders are almost taking care of themselves. Serious congestion of shipments from New England plants is reported. Many of these plants have orders for tools for England and France, shipments of which the railroads will not accept on account of present congestion at the seaboard.

A manufacturer of electric motors writes to THE IRON AGE stating that it has a large stock of motors on hand for immediate shipment and deliveries on types which are not in stock are to be had in periods ranging from 60 days to 28 weeks.

Complaint has been raised officially against the slow methods of various Government departments in meeting their bills, this having worked serious hardship to machine-tool builders and dealers. The National Supply & Machinery Dealers' Association is conducting an investigation among its members to determine just how serious the situation is. The matter will be brought to the attention of the War Industries Board, the Navy Department and the War Department to obtain, if possible, acceleration of payments.

V. Dauriac, 31 Rue de Lasseppe, Bordeaux, France, is in the market for machine tools, soft steel plates and soft round iron or steel. The machines he wants are listed as follows:

One lathe which can take a plate 1.2 m. length of the bed, useful length of gap 350 mms.

One shaper 400 mms. travel.

One gear cutting machine, greatest diameter 750 mms.

One bending machine 2 meters passage greatest thickness of the plate 3 mms.

15 to 20 automatic planers, minimum travel 1 m., up to X.

Ricardo Mateos Garcia, 92 Fuencarral, Madrid, Spain, has sent an inquiry to agents in this country for the following machines: A machine group for making brass screws with a maximum length of 30 mm., and maximum thickness of 4 mm., the group to be automatic and made up of a machine for making a head plain form or heavy round and one for splitting the head of the screws, that is to say, making the screw driver catch; an automatic machine for stamping pieces of a maximum diam. of 35 to 40 mm.; machine for stamping pieces of brass with a diam. not greater than 100 mm.; machine for pressing by hand and stamping small pieces. He is also interested in a complete plan for polishing and nickel-plating the above mentioned pieces. Correspondence should be in Spanish.

Buffalo

BUFFALO, Dec. 24.

The Sanford Motor Truck Co., 107 St. Marks Avenue, Syracuse, has awarded contract for a one-story plant on West Fayette Street to cost about $9,000.

The Buffalo Foundry & Machine Co., Fillmore Avenue, Buffalo, will build a one-story extension, 20 x 80 ft.

The Automatic Transportation Co., 2933 Main Street, Buffalo, is planning the construction of a two-story factory on Main Street to cost about $45,000.

The Foster Specialty Co., Buffalo, has leased a building at 87 Brayton Street, 70 x 80 ft., for a new brass foundry.

The Cutler Desk Co., 20 Churchill Street, Buffalo, will erect a two-story building, 50 x 150 ft., on Amherst Street, to cost about $20,000.

The Eastern Monolithic Casket Co., Buffalo, has acquired property at Downing Street and South Park Avenue as site for a waterproof casket factory to cost about $25,000. The company is also considering the establishment of other branch factories. William Hurley is president.

The Buffalo Engine Co., Buffalo, has acquired a two-story building with about 15,000 sq. ft. of floor space on Superior Street which it will equip.

The Erie Pump & Engineering Co., Erie, Pa., has been incorporated with a nominal capital of $5,000 to manufacture pumps, etc. W. N. Seitz, Erie, is the principal incorporator.

The Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., has increased its capital from $500,000 to $1,000,000.

The Gleason Works, University Avenue, Rochester, manufacturer of gears and gear-cutters, has filed plans for a one-story foundry addition, 73 x 80 ft., to cost $12,000.

The High Speed Hammer Co., Rochester, has been incorporated with a capital of $90,000 by L. D. Mahoney, F. W. Weeks and R. C. Schaefer.

The Carrib Service Mfg. Corporation, Rochester, has been incorporated by C. H. Schauman, P. C. Birr and A. M. Weller with a capitalization of $50,000 to manufacture office supplies and appliances.

The Archbold Brady Co., Syracuse, N. Y., manufacturer of poles, has completed plans for a factory which it will erect on Greenway Avenue.

New England

BOSTON, Dec. 24.

The aggregate of machine tool purchases continues at the same high level of the last two months. The buying is very much scattered and is largely directly due to increased activity of munitions plants. The business of the tool shops is again becoming a feature of the market and the call for tool room sizes and kinds of machine tools is eating into the stocks on hand.

Labor is scarcer than ever and the unrest of the past months has greatly decreased. The coal shortage is acute, but some measure of relief is expected immediately and the campaign for coal conservation is taking substantial form. In many places there will be an extended shutdown over the holidays, which will mean a considerable saving.

The General Electric Co. is to build two factories, 67 x 340 ft., two stories, and 23 x 59 ft., one story, and a two-story office building, 60 x 140 ft, at its River works, Lynn, Mass.

The Framingham Foundries, Boston, has been incorporated with authorized capital stock of $350,000. Fisher H. Nesmith is president and Alexander G. Grant, 84 State Street, treasurer.

The Osgood Bradley Car Co., Worcester, Mass., is erecting a two-story office building, 40 x 55 ft.

The Deane Machine Co., Fitchburg, Mass., has been incorporated with authorized capital stock of $50,000. John M. Graves is president and Alfred P. Cate, 470 Main Street, treasurer.

The Sterling Motor Car Co., Brockton, Mass., is having plans drawn for a one and two-story addition, 100 x 100 ft.

The Liberty Shipbuilding Co., Boston, has been incorporated with authorized capital stock of $500,000. William J. McDonald is president and Max Shoolman, 372 Chestnut Hill, treasurer.

The Gile Marine Engine Co., Congress Street, Boston, is erecting an office building at its plant on Middlesex Avenue, Somerville.

The Liberty Screw Co., Worcester, Mass., has been incorporated with authorized capital stock of $10,000. A. J. Booth is president and Walter C. Rice, treasurer.

The East Deering Foundry Co., Portland, Me., has been incorporated with authorized capital stock of $10,000. George R. Thomas is president and Charles E. Noyes, treasurer.

The Greenfield Tap & Die Co., Greenfield, Mass., is moving its offices from the old quarters in the Wells Brothers and the Wiley & Russell divisions to its new office building on Sanderson Street. A new restaurant and stores building will also soon be put into use.

The American Tool Co., Meriden, Conn., has been incorporated with authorized capital stock of $10,000 by Harry Parker, Harry C. Weston and Ernest A. Winkel. It will begin business with $2,525.

The Brown-Wales Co., Boston, steel and steel products, contemplates the erection of a machine shop.

George A. Leighton, Manchester, N. H., has awarded a contract for a one-story addition, 58 x 80 ft., to his foundry.

The Warren F. Fraser Co., Westboro, Mass., has awarded a contract for an addition. The company is very busy on grinding machines.

Philadelphia

PHILADELPHIA, Dec. 24.

The machine shop to be erected by the Philadelphia & Reading Railroad at its Erie Avenue yards in Philadelphia will be steel, brick and reinforced concrete, one story, 156 x 216 ft. A 16-stall engine house will also be constructed. The structures will cost about $323,500.

Maris Brothers, Fifty-sixth Street and Gray's Avenue, Philadelphia, manufacturers of machinery, will soon commence the erection of a one-story machine shop addition, 30 x 40 ft., to cost $10,000.

The Navy Department, Washington, has completed a new plant at the Philadelphia Navy Yard for the manufacture of airplanes. It covers about 3 acres and has cost $1,000,000. A call has been issued for 2000 skilled workmen for initial activities. The plant will include machine work, coppersmithing, sheet-metal working, pattern making, welding, tubing, wire working and joinery.

The Hulton Printing Processing & Dyeing Co., 3851 Frankford Avenue, Philadelphia, will build a one-story machine shop, 68 x 140 ft., at Valetta and Coral streets.

The Bureau of Yards and Docks, Navy Department, Washington, has awarded contract for a one-story ammunition box repair plant at Fort Mifflin, Philadelphia, to cost $50,000.

A one-story power house to cost about $10,000 will be constructed by the Wallace Co., Philadelphia, at Island Road and Eighty-first Street.

The Merchant & Evans Co., 517 Arch Street, Philadelphia, manufacturer of brass and bronze products, cornices, ventilators, etc., has filed plans for an addition to its machine shop at 2025 Washington Avenue, to cost $18,500.

The Philadelphia & Reading Railroad, Philadelphia, is taking bids for a power house at Skillman, N. J. Samuel T. Wagner is engineer.

The New York Shipbuilding Co., Camden, N. J., has awarded contract to Fraser, Brace & Co., 1328 Broadway, New York, for a two-story brick and steel machine shop, 78 x 200 ft., to cost $30,000.

The Blaisdell Pencil Co., Camden, N. J., has been incorporated with a capital of $500,000 to manufacture pencils, etc. Charles Kropp, Trenton; F. A. Cigal, Little Falls, N. J., and Stuart H. Heist, Center Square, Pa., are the incorporators.

The Skillman Co., Trenton, has been incorporated with a capital of $125,000 to manufacture hardware. William C. Wherry, Jacob Bohnenberger and John C. Shuster are the incorporators.

The Lycoming Foundry & Machine Co., Oliver and High streets, Williamsport, Pa., manufacturer of gas and gasoline engines, etc., is negotiating for property to permit the construction of a foundry addition at its works.

Peter Frey, State Street, Wilkes-Barre, Pa., has had plans prepared for a one-story forge and blacksmith works, 40 x 80 ft., on State Street.

The Wilmot Engineering Co., Hazleton, Pa., manufacturer of iron and steel castings, coal mining machinery, breakers, etc., has had plans prepared for additions to its plant at White Haven, to include a machine shop, pattern shop and power station. George W. Wilmot is president.

The foundry and iron works of the William F. Remppis Co., Spruce and Mifflin streets, Reading, Pa., on property 100 x 400 ft., has been acquired by Ferdinand Thun for $33,000. Mr. Thun and associates have recently incorporated the William F. Remppis Iron Works with capital of $50,000, and propose to operate the plant. William F. Remppis and Lambert A. Rehr, Reading, are also interested in the new company.

The Champion Blower & Forge Co., Harrisburg Avenue and Charlotte Street, Lancaster, Pa., has filed plans for an extension to its assembling works, 50 x 100 ft.

The Belmont Motors Corporation, Harrisburg, Pa., is planning for the erection of a new plant at Lewistown. The local board of trade is arranging for a site. G. G. Gochnaur is president.

The Jeansville Iron Works, Hazleton, Pa., will soon commence the erection of another extension to its plant.

The proposed new carbon works at Scranton, Pa., of the National Carbon Co., Cleveland, will be located on North Washington Avenue, and is expected at the start to give employment to about 50 hands.

Baltimore

BALTIMORE, Dec. 24.

The Mann Shipbuilding Co., Light Street, Baltimore, is having plans prepared for a shipbuilding plant on Curtis Bay to cost about $100,000. W. B. Mann is president.

The Henry Smith & Sons Co., East German Street, Baltimore, has acquired a site, 170 x 245 ft., at Donaldson, Race and Clarkson streets for extensions to its shipbuilding plant.

The T. A. Gillespie Loading Co., Dover, Del., has been incorporated with a capital of $2,000,000 to operate a machine shop and foundry business. L. B. Phillips and J. B. Bailey, Dover, are the incorporators.

The Penn-Seaboard Steel Corporation, New Castle, Del., has completed plans for a one-story foundry, 90 x 380 ft., to cost $100,000. Headquarters of the company are in the Franklin Building, Philadelphia.

The Bureau of Yards and Docks, Navy Department, Washington, has taken bids for a five-story optical shop at the Washington Navy Yard.

The Atlantic Coast Line Railroad, Wilmington, N. C., has commenced the erection of an engine repair shop to cost about $10,000.

The International Navigation Co., Wilmington, N. C., has acquired about 600 acres of property on the Cape Fear River for a new shipbuilding plant. W. H. Garland is president.

The Southern Shipbuilding Co., Mt. Pleasant, S. C., recently incorporated, is planning the construction of a plant to specialize in the building of steel freighters up to 7500 tons capacity. H. N. Whittelsey is president and W. E. Allen, vice-president.

Chicago

CHICAGO, Dec. 24.

The Standard Steel Car Co., which recently placed orders for tools to be delivered to its Hammond, Ind., plant, is in the market for a much larger number, most of which will be placed in the East. The company's war order is said to total $60,000,000. It will build a hotel and 150 houses to accommodate additional employees. Another large list will probably be forthcoming from the Rock Island Arsenal if it is determined to make certain changes in recoil mechanisms. The newer design, if adopted, will require a number of arc-planing machines.

Deliveries on tools in demand for war purposes are worse than they have been at any time heretofore, and an ordinary industrial buyer cannot place one order. On the other hand, small machines of various kinds, especially lathes, are easily obtainable for immediate shipment.

The shortage of coal, especially in Michigan, has caused several metal-working plants to go on shorter hours. Several companies in Muskegon which depend for power on a public service company have been unable to get sufficient current because the electric company could not get enough coal. Several of these plants have war orders, but have had to curtail operations, some going on a 7-hr. day. It is probable that the situation will soon be relieved by the diversion of coal from non-essential to essential manufacturers.

The International Shipbuilding Co., Orange, Tex., has placed an order with the Abell-Howe Co., Chicago, for seven 3-ton hoists with a lift of 60 ft., making 10 placed with that company.

E. I. du Pont de Nemours & Co. have taken over land having a frontage of 639 ft. on the north branch of the Chicago River, and it is understood that a four-story fireproof factory will be erected at an early date. The product of the plant has not been announced, but there is talk of making dyes.

J. L. Carnegie & Son, 189 West Madison Street, Chicago, have been awarded the general contract for a one-story factory, 125 x 152 ft., 48 x 148 ft. and 25 x 75 ft. at Fulton and Leavitte streets for George P. Nichols & Brother, manufacturers of railroad machinery, now at 614 South Canal Street. The new plant will cost about $50,000.

The Dakota Sales Co. has been organized in Bismarck, N. D., with a capital stock of $25,000 to manufacture grain cleaning machinery, with offices and a factory in the building formerly occupied by the Capital Motor Co., Bismarck. The directors are C. Williams, H. L. Stegner and C. C. Putnam.

The Liberty System Co., Edwardsville, Ill., will establish a factory for the manufacture of automatic accounting machines and will temporarily occupy the building of the Elder Mfg. Co. The company is headed by Samuel F. Lloyd, auditor of the N. O. Nelson Co., Edwardsville.

The Indiana Air-Craft & Mfg. Co., Indianapolis, has been incorporated to manufacture airplanes and automobiles. The directors are Lewis Wallace, George H. Cottrell, A. B. Jennings, Joseph T. Markey and Albert D. Johnson.

The machine shop of the Graver Tank Works, East Chicago, Ind., was destroyed by fire Dec. 15, causing a loss of $50,000. The plant was working on Government shipbuilding contracts.

Milwaukee

MILWAUKEE, Dec. 24.

The demand for machine-tools the past week or 10 days has shown considerable acceleration. While no large lists have come to light, it is known that many shop-owners are looking for small lots to enable them to handle sub-contracts for which their existing equipment is only partly suitable. The aggregate of such requirements is quite formidable.

Manufacturers of machine-tools, especially milling machines, continue to receive orders in large numbers and pressure upon their facilities increases from day to day. The urgency of demand is also very strong, but no relief in deliveries is looked for.

Although the high cost of equipment has long discouraged the development of electric light and power plant projects, both steam and hydroelectric, one contract of unusual size for equipment for a large hydroelectric installation in Wisconsin was placed the past week.

The Wisconsin Duplex Automobile Co., Clintonville, Wis., will locate its plant at Oshkosh, Wis. Details have not been completed, but the company will build a factory and shop group if no suitable buildings are available.

The Jackson Milling Co., Stevens Point, Wis., owned by the Mead-Witter Co., Grand Rapids, Wis., has awarded a contract to the Allis-Chalmers Mfg. Co., Milwaukee, for the equipment required for a new hydroelectric plant on the

Wisconsin River at Stevens Point, to cost about $500,000 complete. The equipment will consist of six 950-hp. vertical open-flue hydraulic turbines, direct-connected to six 800 kva., 60-cycle, alternating current motors with governors, and two 200-kw. motor-generator sets.

The Hoehne Machine Works, Kaukauna, Wis., has been incorporated with a capital stock of $35,000 to succeed to the partnership of the same name formerly known as Hoehne & Knitter, founders and machinists, Kaukauna. The officers are: President, Fred Hoehne; vice-president, Herman Hoehne; secretary and treasurer, W. M. Hoehne.

The Young Patent Hoist Co., Milwaukee, manufacturer of hoisting devices for motor truck dump bodies and other purposes, has moved its plant from Clinton and Virginia streets to 35 Twenty-fifth Street, where greatly enlarged facilities are available and the output will be materially increased. Edward R. Bacon is general manager.

The Reliance Motor Truck Co., Racine, Wis., has engaged A. Arthur Guilbert, architect, Racine, to prepare plans for its new plant at Appleton, Wis., to be erected early in 1918. Details have been modified to provide for a larger initial unit, which will be 75 x 300 ft., one-story, with sawtooth roof of reinforced concrete, steel and brick construction. Bids will be taken about Jan. 15 and it is hoped to have the plant ready for operations within 60 or 70 days thereafter. Considerable equipment is being purchased. Ira L. Miller is president and Charles H. Piggins, general manager.

The Highway Trailer Co., Edgerton, Wis., has leased a building adjoining its plant in order to provide capacity for the execution of a Government contract for army trailers and airplane transportation trucks. No considerable amount of new equipment will be purchased, although the company is buying small lists from time to time. James W. Menhall is president.

The Girnan & Sons Co., Eau Claire, Wis., vehicle manufacturer, is planning to build a new factory, garage and machine-shop, 45 x 75 x 150 ft., two stories, costing about $25,000.

The W. S. Seaman Co., 480 Virginia Street, Milwaukee, manufacturer of automobile bodies, telephone booths, etc., has increased its capital stock from $50,000 to $100,000 to accommodate the growth of its business. A branch factory recently was established at 233-257 Clinton Street. Irving Seaman is secretary.

The Electric Farm & Lighting Power Co., Antigo, Wis., has been incorporated with a capital stock of $25,000 to manufacture individual or isolated light and power plants and systems and other electrical equipment. The incorporators are R. P. Brown, John H. Walechka and J. T. Brown.

The Wisconsin Aluminum Foundry Co., Manitowoc, Wis., has received a proposition from the Advancement Association, Rice Lake, Wis., to establish a branch plant in that city. The Wisconsin company has been overcrowded for some time and is contemplating additions. Two large contracts for castings have just been booked which will require overtime operations for four to five months.

The United States Gearshift Co., Eau Claire, Wis., which recently awarded contracts for the erection of a four story machine shop and foundry, 65 x 80 ft., has engaged Edward Hutchens, 866 Superior Street, Milwaukee, as consulting mechanical and structural engineer. Specifications for equipment are now being completed. L. A. Laursen is secretary and general manager.

The Horizontal Hydraulic Hoist & Body Co., Milwaukee, has been incorporated with a capital stock of $50,000 by Edward R. Bacon, Benjamin A. Rees and Charles F. Millmann to manufacture hydraulic hoisting devices and complete dump bodies for motor trucks. Details will be announced later.

Detroit

DETROIT, Dec. 24.

The demand for machine tools is unusually strong. Practically all orders are directly or indirectly for the manufacture of munitions. High-grade machines especially of the heavier variety are consequently being ordered in large numbers. This demand is so great that deliveries are placed from three to five months ahead and dealers anticipate no improvement until it abates. Many of the larger factories face a shutdown due to lack of coal. The Ford Motor Co. has been working on a day-to-day basis. Temporary alleviation of the situation resulted from the receipt of several hundred carloads of coal the latter part of last week, but the condition is still very serious. The large manufacturers are badly handicapped by the impossibility of securing expert workmen.

The Detroit Shell Co., Detroit, Mich., which was recently incorporated with a capital stock of $2,000,000 to make shells, has acquired the plant of the Springfield Body Co., and is expected to place orders for shell making equipment shortly. John Kelsey of the Kelsey Wheel Co., is president and several other men associated with the Detroit automobile industry are interested.

The Ford Tractor Co. is working on an order of 6000 to 7000 tractors for England, and it is stated France has been notified that it can be furnished with 12,000. Tests are being made and indications are that the plant will be running to capacity constantly.

The Marquette Motor Works, Saginaw, Mich., which has been idle for years, will be opened about Jan. 1 by the General Motors Co. with a working force of between 1000 and 1500 for turning out war material. Much special machinery will be required to re-equip it and workmen are now preparing to install machinery.

The Industrial Works, Bay City, Mich., is spending about $50,000 for additions and improvements in its plant to take care of Government orders for cranes, including an addition to the foundry.

The plant of the Fulton Mfg. Co., Bay City, Mich., which recently failed, has been purchased by W. F. Jennison, who plans to re-open and continue it as a wood-working shop.

The W. J. Baird Machinery Co., Detroit, has moved from 56 Jefferson Avenue to a building on the corner of Jefferson and Brush Streets.

The Detroit Furniture Mfg. Co., Detroit, suffered a loss of about $20,000 by fire last week.

The Kolby Wheel Co. of Utah, manufacturer of a resilient wheel with air cushion at the hub, will locate in Detroit as soon as a desirable place is found. Ernest Hall is interested in the company and has been largely instrumental in inducing the officials to move to Detroit.

The Michigan Drop Forge Co., Pontiac, Mich., has increased its capitalization to take on Government work.

The Truman M. Smith Machine Co., Grand Rapids, Mich., has been incorporated with a capital stock of $60,000. The incorporators are T. M. Smith, Jr., I. Preston Rice and Gerald McCoy.

The Grand Rapids Salvage Co., Grand Rapids, has acquired a building at 33 and 35 Market Avenue, which it will convert into a factory for making truck bodies, paper balers, and fabricating steel.

Cleveland

CLEVELAND, Dec. 24.

New inquiry for machine tools is plentiful, and only a slight falling off on account of the holiday season is noted. Definite lists have appeared from the Morgan Engineering Co., Alliance, Ohio, which will purchase approximately 200 lathes and other machines for gun carriages. The Templars Motor Corporation, Cleveland, is still buying equipment for machining 150,000 6-in. shells for the Government and is now asking for 24 or 26-in. lathes. Orders for machines in lots of four or five for Government work are fairly numerous. An order for four boring mills was taken the past week by a local machinery house. A Canton company is in the market for 12 drilling machines.

The American Multigraph Co., Cleveland, has placed a contract for the erection of a one-story addition, 45 x 60 ft. It is working on munitions for the Government.

The Elliott Electric Co., Cleveland, contemplates building an addition to its plant for the manufacture of electrical devices.

The Northern Fire Appliance Co., Cleveland, has placed a contract for the erection of a factory, 50 x 100 ft., on East 152nd Street.

The Kain & Aunger Co., Cleveland, has been incorporated with a capital stock of $10,000 by Robert Kain, E. F. Aunger, E. H. Aunger and others to engage in sheet metal work. It succeeds to the business of the Ohio Sheet Metal Works and has recently moved into a new plant at 1364 East Thirty-fourth Street, where it occupies two floors, 45 x 80 ft.

The Mather Spring Co., Toledo, Ohio, has awarded a contract for the erection of an addition.

The Lake Erie Dry Dock & Engineering Co., Sandusky, Ohio, is reported to have taken a Government order for 10 boats, each 261 ft. in length, which will necessitate the purchase of considerable equipment.

The Lima Rivet & Forge Co., Lima, Ohio, recently incorporated, has acquired a four-acre site and is having plans prepared for a factory. It is stated that approximately $40,000 will be spent in erecting the plant.

The Hydro-Carbon Wickless Burner Co., Fostoria, Ohio, has been incorporated with a capital stock of $1,000,000 to manufacture a new type of wickless burner for use with kerosene. Henry J. Sommers is president; W. F. Steele, vice-president, and E. C. Pfiel, secretary and treasurer. It is reported that the company will establish factories in different cities.

The Chamber of Commerce, Marion, Ohio, has closed negotiations with Richard Lau, Buffalo, N. Y., to establish a brass and bronze foundry in that city.

The New London Commercial Body Co., New London, Ohio, has been incorporated with a capital stock of $30,000 to build automobile bodies. C. O. Harmon, Cleveland, is president, and T. O. Albaugh, temporary secretary.

The Ohio Foundry Co., Bucyrus, Ohio, will build two extensions to its plant for office purposes.

The Cambridge Foundry & Machine Co., Cambridge, Ohio, which recently took over the Cambridge Machine Co., has been incorporated with a capital stock of $50,000, and will shortly begin the erection of a two-story extension, 50 x 87 ft. In addition to this the present plant will be enlarged to double the floor space.

Cincinnati

CINCINNATI, Dec. 24.

A plan to establish a munitions plant in Cincinnati for finishing shells is under serious consideration. Prominent manufacturers are interested in the project and definite action is expected soon after the holidays. It is said that the proposition has reached the point where a tentative option has been taken on a plant now in operation, and if the program is carried out new machinery will have to be installed.

Machine tools are so scarce that dealers have practically confined their efforts to doing business with plants having Government contracts. Heretofore only new machines were requisitioned, but attention has now been given to second-hand tools, the supply of which is limited. Jobbing foundries have not yet been compelled to shut down on account of a coke shortage and as a consequence machine tool castings are being received on contract time.

The D. T. Williams Valve Co., Cincinnati, has purchased the plant of the Queen City Brass & Iron Co. ,on Spring Grove Avenue, and will add equipment to increase its output of engineering specialties.

The Champion Tool Works Co., Cincinnati, lathe maker, expects to have its new plant at Winton Place in full operation within the next 30 days. All equipment has been purchased.

The Watkins Motor Co., Cincinnati, recently organized, has leased quarters at 826 West Sixth Street, and will manufacture electric motors.

The Shepard Lathe Co., Cincinnati, has completed the removal of its plant from 207 East Sixth Street to a building at Canal and Jackson streets.

The Superior Foundry Co., Hamilton, Ohio, has been incorporated with $50,000 capital stock by A. D. Stucky, C. E. Freeman, F. G. Traber and others. The company has been operating a plant under a partnership arrangemtnt and will install equipment to increase its output of gray iron castings.

The Manufacturers' Production Co., Dayton, Ohio, is reported to have acquired the plant of the Stevens Mfg. Co., which it is equipping to fill a Government contract.

The Columbus Iron & Steel Co., Columbus, Ohio, is building an addition to its plant for storage purposes.

The Simplex Machine Tool Co., Columbus, recently received a large order for lathes, and is adding equipment to its shop.

The Indiana Truck Co., Marion, Ind., is having plans prepared for an addition to its plant.

The Central South

LOUISVILLE, Dec. 24.

Nothing in the way of a holiday lull has developed in this market and manufacturers are operating to capacity. Motors are moving briskly, early deliveries of which are more available than any other line. One of the largest local boiler and machinery companies is booked full for a year and is taking no new business. Weather conditions have slowed down outside work. A somewhat better labor supply is noted. Coal is again more easily obtained.

The Dawson Lumber Co., Louisville, has been incorporated with capital stock of $30,000 by John L. and Robert S. Dawson and John W. Kitchen, and will establish a mill.

Fire destroyed the plant of the Leonard Brush & Woodenware Co., Louisville, with a loss of $40,000. It is endeavoring to re-establish a factory in a new location.

The Roy C. Whayne Supply Co., Louisville, is in the market for: Three three-phase, 25 or 60 cycle, 2200 or 440 volt, motor-driven air compressors of 300 to 500 cu. ft. capacity per min.; five slack line cable electrically operated excavators, 400 to 800 ft. span; twenty, 1 or 2-yd. V-shaped dump cars; fifteen, ½ to 1-yd. concrete mixers, three-phase, 25 or 60 cycle, 2200 or 440 volt; fifteen Bucyrus or Marion drag-line, 80 to 150-ft. booms, electric preferred; 200 12-yd. air dump cars, standard gage; fifty, 4 and 6-yd. dump cars, 36-in. gage; five each, Keystone, Star and Cyclone drills; twenty 40 to 70-ton standard gage locomotives; 10 16-ton dinkey 36-in. gage and heavier; ten 4, 6 and 8-in. discharge centrifugal pumps for 50-ft. head, direct connected, and five 60-ton Bucyrus or Marion steam shovels. Electric motors of the following horsepower are also wanted for 60 or 25-cycle, 2200 and 440-volt current: 15 to 25-hp., slow speed, squirrel cage; 100 to 300-hp., high speed, squirrel cage; 200 to 300-hp., 450 to 600 r.p.m., slip-ring type; 75 to 100-hp. 600 to 900 r.p.m.

Fire destroyed the plant of the Jackson Light & Ice Co., Jackson, Ky., with a loss of several thousand dollars. The boilers alone were undamaged.

The Utility Gas Coal Co., Pineville, Ky., is developing 200 acres of coal land and is asking for prices on equipment including an electric-driven fan and electric hoists.

Fire Dec. 20 destroyed the cotton gin plant of the Hale Cotton Gin Co., with a loss of $8000. The machinery was destroyed.

B. L. Sylar, James Building, Chattanooga, Tenn., is asking for prices on a coal-stripping steam shovel, 70 to 80-ft. boom.

The Harriman Mine Car Mfg. Co., Harriman, Tenn., has been purchased by J. N., Joseph and William Baker and others, who propose to make additions to increase the capacity.

The Palace Garage & Sales Co., Knoxville, Tenn., is re-equipping a building at 703 South Gay Street for automobile repairs and will install a machine shop to manufacture small parts.

The M. A. Sweeney Shipyards & Foundry Co., Jeffersonville, Ind., is relocating following the collapse of a part of its building on East Market Street. The company is executing a Government contract for field ranges.

St. Louis

ST. LOUIS, Mo., Dec. 24.

The Farmers' Gin Co., Soper, Okla., L. A. Bateman, D. T. Jones and others interested, is in the market for about $15,000 worth of cotton compress equipment.

The Rex Stove Co., Fort Smith, Ark., has been incorporated with a capital stock of $100,000 by Wilson J. Henry, W. J. Echols and others to make stoves.

John W. Meeks and others, Pocahontas, Ark., have organized to equip a plant to manufacture hay presses.

The Laclede Gas Light Co., St. Louis, will equip a $400,000 plant to repair meters and motor cars, etc.

The C. L. Gray Lumber Co., Meridian, Miss., has increased its capital by $200,000 and will add to its milling equipment.

The plant of the Blackwell Mill & Elevator Co., Blackwell, Okla., was destroyed by fire with a loss of about $50,000 to machinery, which will be replaced at once.

The Merrimac Veneer Co., Byram, Miss., has been organized with $50,000 capital by Frank and Robert Morrison and Thomas McCase and is in the market for veneer making equipment.

The Maryville Electric Light & Power Co., Maryville, Mo., has acquired the plant at Grant City, Mo., which it will remodel.

St. Joseph, Mo., is in the market for about $31,000 worth of new machinery for its electric light and power plant.

The Akers Mfg. Co., Kansas City, Mo., has been incorporated with a capital stock of $30,000 by H. H. Akers, A. A. Buxton and L. A. Buxton to manufacture brass, iron and other castings.

The American Die Mold Co., St. Louis, has been incorporated with a capital stock of $50,000 by G. Howard Thompson, W. C. Siebens and others to manufacture die molds.

William Gilbert, Fulton, Mo., will equip a foundry and machine shop at Ada, Okla., and is in the market for the machinery.

The Visible Pump Co., Oklahoma City, Okla., has been organized by Orville Knight and J. B. Pickens, Drumright, Okla., to manufacture pumps.

The Am-I Oil & Refining Co., Oklahoma City, Okla., capital $400,000, G. R. Mesker and others interested, will equip a refinery, and is taking bids on machinery.

John W. Hogan, Tulsa, Okla., will build an oil refinery at Shawnee, Okla., at a cost of $300,000.

The Columbus Lumber Co., Columbus, Miss., D. F. McCullough manager, will expend about $70,000 for new equipment, including boilers, engines, machinery, locomotives, etc.

The Miami Zinc & Lead Syndicate, Inc., Miami, Okla., capital $5,000,000, E. D. Nix, W. H. Logan and others interested, has acquired the St. Louis Mining & Smelting plant

and will expend about $5,000,000 on several mills, a new smelter plant, etc.

Pawhuska, Okla., is in the market for about $20,000 worth of pumping station equipment.

The Excelsior Tool & Machine Co., East St. Louis, Ill., is in the market for core ovens, electric cranes and other heavy equipment.

The Blackstone Consolidated Coal Co., Okmulgee, Okla. W. H. Wigton manager, is in the market for hoisting and haulage engines, conveyors, scales and other equipment.

The Nichols Pump & Well Co., Stuttgart, Ark., has been incorporated with a capital of $50,000 to manufacture pumping machinery. J. P. Nichols and H. C. Hollis are the principal incorporators.

Texas

AUSTIN, Dec. 22.

The recent action of the Mexican Government in issuing a decree placing almost prohibitive duties on iron and steel and machinery has almost put a stop to that branch of export trade which is felt particularly by dealers in San Antonio and El Paso.

The Givens Union Gin Co., Givens, will construct a cotton gin. J. H. Hodges is a stockholder.

The Phoenix Mills, Phoenix, Ariz., will build a reinforced concrete grain elevator to cost $31,000.

The Southwest Cotton Co., Glendale, Ariz., will construct several new cotton gins at points in the Salt River valley at a total cost of about $250,000.

The Arizona Egyptian Cotton Co. will build several cotton gins in the Salt River valley adjacent to Phoenix, Ariz.

It is announced that the plant of the Texas Motor Car Co. which is being organized with a capital stock of $2,000,000 will probably be located at Dallas. It has $1,000,000 of capital paid in with which to begin operations. The assembling plant will have a floor space of more than 250,000 sq. ft., and the minimum output, it is stated, will be 6,000 automobiles a year. J. C. Vernon is president.

The Pierce Oil Corporation, recently granted a Texas charter, will make its headquarters in Dallas. It has a capital stock of $33,000,000 and has taken over the two refineries, pipe lines and other holdings of the Pierce-Fordyce Association in Texas. It is authoritatively announced that the company will double the capacity of its refinery at Fort Worth and will make additions to its plant at Texas City. It is also considering plans for another refinery which will probably be located at Houston.

The International Marine Iron Works, Houston, has a contract with the International Shipbuilding Co. for marine engines and other machinery amounting to $2,500,000. It is stated that the ships which the International Shipbuilding Co. is constructing at Gulfport and Pascagoula, Miss., and Orange, Tex., will be brought to Houston to be equipped. The International Marine Iron Works has also obtained a contract for 88 propeller wheels for the Government, which involves an expenditure of about $150,000. F. C. Johnstone is vice-president and general manager.

The Uvalde Electric & Ice Co., Uvalde, will install additional machinery in its plant to provide power for irrigation pumps and industrial plants.

The Marfa Electric & Ice Co., Marfa, will install additional machinery in its electric light and power plant. It has also been granted a franchise to supply the city with water and will sink a number of wells and install pumps.

California

SAN FRANCISCO, Dec. 18.

Facing a serious shortage of railroad motive power and rolling stock on the Pacific coast, some representatives of machinery houses are declining to guarantee deliveries, even to the Government. They say that they will deliver to the railroad at the point of manufacture if specified dates are guaranteed by them, but they take the stand that the Government must assume the responsibility of getting shipments through to the point where it needs them. Those who have taken this stand have lost some Government contracts, but they have saved themselves much trouble and possible penalty for failure to deliver. The demand for large tools, especially those made necessary by the inauguration of so many new shipbuilding plants, is still heavy. These tools are coming in under Government orders, and, as most of them were ordered months ago, they are arriving in good time.

The shipbuilding industry is constantly expanding, and, in the main, new machinery which is constantly being ordered, is either for these companies or for foundries or machine shops which will make ships' parts.

Among the makers of ships' parts is the Joshua Hendy Iron Works, San Francisco. Within the past six months it has more than doubled its capacity. It has a subsidiary contract from a shipbuilding company for building many of the parts of 12 steel ships, and is now working two overlapping shifts, making a 22-hr. day. All the foundries about San Francisco Bay are busy, as well as the machine shops. The great trouble has been to obtain and keep sufficient help. It is predicted that they will be forced to raise wages to a parity with the shipbuilders, about 35 per cent over 1916 payrolls.

New shipbuilding plants are being established about the Bay and old ones are being enlarged, and the same story is told of other parts of the State. The Hanlon Dry Dock & Shipbuilding Co., Oakland, has acquired a large acreage adjacent to its present yard and will install machinery to handle steel as well as wooden ships. Keels of two steel ships were laid in the last week. The recommendation of Alameda as the site for an additional navy yard on the Pacific coast will mean the purchase of considerable machinery, and it is understood that the Union Construction Co., which recently closed a contract for 45 acres of tideland with the city of Oakland, will have its plans ready in a short time for financing its project. Reports from San Diego state that the U. S. Steel Shipbuilding Corporation has closed a contract for ten vessels and is buying machinery in Chicago. From Anaheim comes the report that H. S. Duncan and Leon Figheroa, both of New York City, have offered to establish a $3,000,000 plant for shipbuilding at Anaheim if the city will alter the channel now under construction.

John F. Craig, Long Beach, has purchased the plant and Government contracts of the California Shipbuilding Co., a plant which was established by him and sold to the California Shipbuilding Co. two years ago. A new company will be incorporated for $1,000,000. Lloyd Swayne of the shipbuilding firm of Swayne & Hoyt, San Francisco, will be associated with him.

Charles C. Moore & Co., San Francisco, have just closed a contract with the Government for two large naval oil stations, one at Pearl Harbor, Hawaii, and the other near Bremerton, Wash. It is understood that the contract price was $1,000,000 and the time limit nine months.

The new company which has taken over the firm of Baker & Hamilton and the Pacific Hardware & Steel Co., San Francisco, has been named the Baker, Hamilton & Pacific Co. It is capitalized at $4,250,000 and will enter the hardware trade of the Orient, Australia, etc.

The Standard Engine Co., Oakland, is erecting a building, 50 x 325 ft., in which will be installed a 43-in. lathe and some smaller automatic tools, doubling the capacity of its plant.

The Samson Sieve-Grip Traction Co., San Francisco, announces that it has withdrawn for the present from the manufacture of marine engines and will confine all its work to making tractors.

The San Diego Bay Shipbuilding Co., San Diego, has been incorporated with a capital of $1,500,000 by W. J. Strachan, Karl F. Enper, J. Burris Mitchel, F. A. Barnett and Leonard L. Jones.

The Scandia Gas Engine Co., Oakland, is about to build a shop, 90 x 300 ft. The equipment, ordered some time ago, will include a 30-ton traveling crane and four lathes from 42-in. to 66-in. swing, and will cost approximately $50,000. Its output will be doubled.

The Schultheiss Co., San Diego, manufacturer of brass bronze and cast-iron fittings, is having plans prepared for a new plant at Bell Station, near Los Angeles, which will consist of a machine shop, 50 x 100 ft.; foundry, 100 x 200 ft; core shop, 50 x 100 ft.; pattern shop, 20 x 30 ft.—all one story—and finishing works, 50 x 100 ft., office and storage building. I. H. Seehorn, 328 Clay Street, Los Angeles, is the architect.

The Occidental Fuel & Machine Co., Los Angeles, has been incorporated with a capital of $75,000 to manufacture fuel machinery. W. A. Hudson, Los Angeles, and J. W. Clark, Alhambra, are the incorporators.

The Schaefer Mfg. Co., 1237 South Figueroa Street, Los Angeles, has been organized to manufacture sheet-metal automobile specialties. Arthur E. Schaefer, 1744 West Forty-second Street, is president.

The Standard Oil Co., Bakersfield, will build a new machine shop at its works at McKittrick.

The Long Beach Shipbuilding Co., Long Beach, Cal., has been incorporated with a capital of $1,000,000. John F. Craig, James G. Craig, Thomas R. Merrell and Lloyd Swayne are the incorporators.

The Sierra & San Francisco Power Co., Modesto, Cal., will make extensions anid improvements at its power plant to cost about $25,000.

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